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IN-USE HEAVY DUTY GASOLINE TRUCK EMISSIONS. PART II. SURVEILLANCE STUDY OF CONTROL EQUIPPED HEAVY-DUTY GASOLINE-POWERED VEHICLES

Melvin N. Ingalls, et al

Southwest Research Institute

Prepared for:

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June 1974

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U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Mobile Source Air Pollution Control
Certification and Surveillance Division
Ann Arbor, Michigan 48105

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Contract No. EHS 70-113

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Exhaust emission tests were performed over a period of two and one half years on a fleet of 152, 1970 and 1971 gasoline-powered trucks of over 6000 pounds gross vehicle weight, which were being used in the San Antonio area. During this period, each truck received up to seven periodic tests for HC, CO and NO by means of a chassis-dynamometer version of the nine-mode engine-dynamometer Federal Test Procedure. Ten of these engines received additional tests in order to obtain correlative data between the chassis and engine-dynamometer procedures.

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ABSTRACT

This report covers two and one half years of periodic exhaust emission tests on a fleet of 1970 and 1971 gasoline powered trucks, over 6,000 lb gross vehicle weight in use in the San Antonio, Texas area. The fleet originally numbered 152 trucks, all of which were part of regular fleets owned by a variety of truck operators. The fleet owners were instructed to operate and maintain the trucks furnished for testing in the same manner as the rest of their fleet. Each truck received up to seven periodic tests for hydrocarbons, carbon monoxide, and nitric oxide during the 30-month surveillance period. The exhaust emission test used was a chassis dynamometer version of the nine-mode Federal test procedure for heavy-duty gasoline engine emission certification. To correlate the chassis dynamometer version with the stationary engine dynamometer version, 10 engines were tested on a stationary dynamometer, installed in their original truck chassis and tested on a chassis dynamometer.

The objectives of the study, to determine the effectiveness of the 1970 heavy-duty exhaust controls and determine their performance with time and mileage, were met. The first test on each truck was performed when it was new or nearly new. The percentage of trucks below the 1970 Federal standards for hydrocarbons and carbon monoxide was calculated for this first test round. A statistical analysis of the periodic tests was performed to determine the effects of time and mileage accumulation. Effects of timing, idle speed, engine model, transmission type, number of cylinders, and several other variables on emissions were also briefly investigated.

FOREWORD

This project was originally initiated in June 1970 by the Inspection and Surveillance Branch, formerly part of the Division of Motor Vehicle Pollution Control at The Willow Run Airport, Ypsilanti, Michigan. The engineering effort on which this report is based was accomplished by Southwest Research Institute, 8500 Culebra Road, San Antonio, Texas under Contract No. EHS 70-113.

Mr. Karl J. Springer, Manager of Emissions Research Laboratory, Southwest Research Institute, was the Project Manager for this work. The principle engineers associated with this project were Mr. Melvin N. Ingalls and Mr. Clifford D. Tyree.

The initial laboratory test phase began in June 1970 and was to have been completed in January 1972. Contract Modification No. 2, dated January 11, 1972, expanded and extended the testing to be done under the contract. Surveillance inspection tests specified under the modified contract were completed in January 1974.

The Project Officer cognizant of this project was originally Mr. Charles Domke, Chief, Inspection and Surveillance Branch, Division of Motor Vehicle Pollution Control, which is now the Surveillance Branch, Certification and Surveillance Division, Office of Mobile Source Air Pollution Control, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, Michigan 48105. Mr. John White of that office assumed Project Officer responsibility about midway through the project. Mr. Gordon Kennedy is presently the Project Officer.

This report completes the second and final phase of a long term study of exhaust emission characteristics of gasoline powered trucks above 6,000 lb gross vehicle weight. The report of Part I of the study, entitled "Mass Emissions from Trucks Operated Over a Road Course", was issued in February 1973 under the identifier number EPA-460/3-73-002A. This project was identified within Southwest Research Institute as No. 11-2862-001.

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I. INTRODUCTION

According to the latest statistical information (1)*, all trucks comprise about 18 percent (21,209,000) of the total vehicles registered and burn approximately 28 percent of the gasoline consumed in the United States. From sales data(1), approximately 38 percent of the gasoline-powered trucks and buses sold are above 6,000 lb gross vehicle weight (GVW). Although there is less known about heavy-duty vehicles (HDV) than light-duty vehicles (cars) in their role as contributors to the total air pollution problem, the Environmental Protection Agency (EPA) has sponsored a continuing long-range investigation of HDV emissions at Southwest Research Institute.

A. Background

This report covers 30 months of surveillance inspections of exhaust emission control equipped 1970-1971 heavy-duty vehicles.

Federal heavy-duty emission standards first became effective with the 1970 model year. To meet these standards, some form of emission control device(s)(9) was required. The need of the EPA for information regarding the effectiveness of these control devices in actual operation led to the surveillance study covered in this report. As this project drew heavily on the knowledge and experience gained in previous heavy-duty projects, a brief review of these projects is presented here.

Southwest Research Institute's Emissions Research Laboratory has been privileged to have conducted a major portion of the research with HDVs beginning in June 1967. This first effort was the acquisition of baseline emissions data from 150 gasoline and LPG fueled spark-ignited engine-powered trucks and buses using three experimental road-like chassis dynamometer procedures. Exhaust emissions for this project were obtained using a special truck version of the constant volume sampler (CVS) which permitted expression of contaminants on a mass basis. The results of the survey are contained in the SwRI final report (2) which concluded that the three proposed experimental non-constant speed cycles were not recommended for use in testing emissions from heavy-duty vehicles powered by spark-ignited engines. The findings of this study were summarized in AIChE and SAE papers(3,4) which described the preparations and baseline data results, respectively.

The second major work in this continuing program compared hydrocarbon (HC), carbon monoxide (CO), and nitric oxide (NO) emissions obtained in actual road driving to chassis dynamometer emissions obtained using the Federal nine-mode constant speed cycle (FTP) for six trucks of various sizes and makes. Using a CVS, the current Federal cycle was subjected to a number of modifications to investigate what improvements might be made to make the Federal procedure agree more with road operation (5).

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* Superscript numbers in parentheses refer to the List of References at the end of this report.

The third in this series of projects, sponsored by the Environmental Protection Agency, was completed in April 1972. The first phase of this three-phase project was a broad emission characterization study of four 1969 trucks under a wide variety of engine speeds, power levels, and both stationary and chassis-operated engines. Emission rates of hydrocarbons, carbon monoxide, and nitric oxide were expressed in mass units of grams per minute, per pound of fuel and per bhp-hr. In addition to the steady-state emission maps, a number of transient accelerations and decelerations were studied using a variety of simulated vehicle inertias. The second phase was a four-vehicle study of the effect of four different road routes on emission rates. The road routes were sufficiently different to be distinct, yet were considered representative of actual truck driving. The final phase was a nine-truck evaluation of an experimental 23-mode test procedure using both stationary-and chassis-operated engines. The three phases of this project generated a large body of data that is summarized in the report(6) and included in some detail in a number of appendices.

B. Scope

This report covers the 30 months (7 inspection rounds) of operation of the surveillance fleet. The results discussed in the report are for the surveillance tests and stationary-to-chassis dynamometer comparison tests only. The results of work done under parts K and L of the Modified Scope of Work (CVS tests and Road Route studies) were covered in a separate report titled "In Use Heavy Duty Gasoline Truck Emissions, Part I, Mass Emissions from Trucks Operated Over a Road Course", dated February, 1973, Report No. EPA-460/3-73-002A

C. Objective

The objective of this project was to determine the effectiveness of exhaust controls on 1970 and 1971 heavy-duty gasoline trucks in the southwestern portion of the U.S. and to establish their performance versus operation (time) and mileage accumulation.

D. Approach

To meet the objectives of the project, a group of at least 140 vehicles were to be inspected periodically measuring exhaust emissions of hydrocarbons, (HC), carbon monoxide (CO) and nitric oxide (NO) using a chassis dynamometer version of the nine-mode engine-dynamometer Federal Test Procedure (FTP) for gasoline fueled heavy-duty vehicles.

Vehicles in this program were chosen to represent, to the extent feasible, the total HDV population by make, displacement, and application. While every effort was made to use new vehicles, it was recognized that it would be necessary to include some vehicles that would have accumulated several thousand miles prior to the start of testing.

Since the official FTP is a stationary engine dynamometer procedure and the surveillance test used an unofficial chassis dynamometer version of this FTP, a check of the correlation of the results from the two methods was necessary. A group of 10 trucks were tested using the nine-mode FTP on both chassis and stationary dynamometers and the results of the two types of tests were compared. In this report, stationary dynamometer is used synonymously with engine dynamometer to indicate an engine test stand dynamometer.

E. Project Reviews

During the initial month of the project (July 1970), several conferences were held with the Project Officer regarding the extent of and date for instrumentation checkout, calibration, and validation. Such a correlation step was considered important to assure acceptable test results. The start of laboratory tests was delayed approximately five weeks by mutual agreement with the Project Officer to permit calibration and correlation with the EPA (then NAPCA) dynamic calibrator. On September 8 and 9, 1970, Mr. Matt Macocha, Mr. Jim Marzen, and Mr. Tom Lyttle visited the Emissions Research Laboratory for the purpose of checking the Laboratory exhaust gas analysis system against the NAPCA dynamic gas calibrator. The Laboratory instrument results varied from the dynamic gas calibrator by more than an acceptable amount. This lack of agreement was subsequently found to be attributed to the combination of gas chromatagraph procedures in defining standard calibration gases and the use of high order polynomial equations to define the calibration curves. To facilitate agreement, on September 24 and 25, 1970, approximately 50 calibration cylinders were transported to the NAPCA laboratories for definition of concentration. Upon return of the cylinders to SwRI, new calibrations of each instrument were performed using the dynamic gas calibrator on November 2, 1970. These calibrations gave satisfactory correlation. The difficulties in correlation of the SwRI gas analysis instruments and the EPA dynamic gas calibrator set back the start of surveillance tests an additional month.

The several months delay in starting tests under this program resulted in 1971 model trucks becoming available. To fulfill the intent of this project, namely evaluation of emissions with low mileage, preferably factory new, as-delivered vehicles, clarification of contract wording was requested of the Project Officer. On November 23, 1970, approval was given to utilize 1971 model vehicles for purposes of this project. On December 16, 1970, Mr. Karl Springer, Emissions Research Laboratory Manager, visited the Project Officer at the EPA's Ypsilanti Willow Run Laboratory for discussions of the project status and progress.

During the week of July 1971, Mr. M. Macocha of the EPA again visited the Emissions Research Laboratory to inspect and check the calibration of the Beckman NDIR instrumentation train. The only item found worthy of special mention was a small leak in the high level hydrocarbon system. The leak was located in a Swaglok tubing fitting near a solenoid valve and affected only the high hydrocarbon part of the system. The leak was assumed to have been the result of a solenoid inspection and cleaning several days before. No surveillance trucks had been tested in the intervening period, so that the leak had no effect on surveillance results. Some deficiencies in record keeping and data logging were noted and immediate changes were made by operating and supervisory personnel to meet the desires of the inspector.

A project review conference was held on February 14 and 15, 1972 at the Emissions Research Laboratory of SwRI. Personnel in attendance from the EPA were Messrs. Charles Domke and Jim Marzen of the Division of Certification and Surveillance and Messrs. Jim Hammerle and David Kircher of the Division of Applied Technology Mr. Karl Springer, Manager of the Emissions Research Laboratory, hosted the meeting assisted by members of the Emissions Research Laboratory professional staff, including Messrs. John Storment, Clifford Tyree and Melvin Ingalls. The project work and results to that date were reviewed and procedures for the work required in the recent contract revision were discussed. The specific item covered applicable to this part of the project was a decision to investigate the possibility of a detailed analysis of surveillance data on a percent change in emission level versus mileage basis and to ascertain cost and effectiveness of this type of analysis. The equipment and procedures used for the chassis version of the Federal nine-mode heavy-duty engine-dynamometer test procedure were observed during an actual surveillance test.

Mr. Tom Bejma of the Surveillance Branch, Division of Certification and Surveillance, Environmental Protection Agency, visited the Emissions Laboratory on June 13 and 14, 1972 to review the project, check test and calibration procedures, and discuss EPA recommendations and requirements for instrumentation calibrations.

The procedures for both truck testing instrumentation and calibration were found to be satisfactory. Several recommendations were made for improvements in instrumentation calibration procedures which were implemented.

Messrs. John White and Tom Bejma, of EPA, visited the Emission Research Laboratory at SwRI on August 8 and 9, 1972. The history and current status of the project was reviewed for Mr. White, who had been designated as Project Officer for Contract EHS 70-113, effective August 4, 1972. Messrs. White and Bejma witnessed the monthly calibration of the Beckman instrumentation system used for the nine-mode FTP. A vehicle test utilizing the chassis version of the nine-mode heavy-duty FTP was also witnessed.

On March 1, 1973, Messrs. Charles Domke and John White of the Environmental Protection Agency again visited the Emissions Research Laboratory for an inspection and project review. The current status of the project was discussed. It was decided to omit from fifth round tests four trucks (units 121 to 124), which had been unavailable for three months due to heavy usage by the fleet owner. Future truck surveillance activities were also discussed. The consensus of opinion was that little additional information could be gained from extending the testing of the current surveillance fleet. However, the Emissions Research Laboratory staff expressed the conviction that some truck surveillance activity should be planned for the 1974 model trucks, since new emission standards had been set for the 1974 model year.

The next project review occurred on July 31, 1973, when Mr. John White visited the Emissions Research Laboratory for inspection and progress review. Another project review occurred on December 15, 1973, when Mr. John White visited the Emissions Research Laboratory accompanied by Mr. John Shelton. The final project review was made on March 25 and 26, 1974 during a visit by Mr. Charles Domke and Mr. John White. The status of the final report and its content and completion of the project were the items of major importance discussed.

II. THE TEST FLEET

The testing performed during this project was in two phases. One phase was the actual surveillance tests themselves, the other phase was a group of tests to correlate chassis dynamometer and stationary engine dynamometer results. This section discusses the reasons for the truck selections and briefly describes the characteristics of the group of trucks used in each test phase.

A. Surveillance Fleet

This fleet of 1970 and 1971 trucks, originally numbering 152, was assembled with the aim of obtaining as many makes and models of trucks as possible, with 5 to 10 trucks per model if at all possible. While the truck population by make and model and the population by gross vehicle weight were the two primary factors considered, other factors such as type of operation and maintenance were also considered in the fleet selection. Availability of trucks in the local area also affected the fleet composition. The resulting fleet, shown by manufacturer and engine displacement in Table 1, was a compromise of all these considerations. Table 2 compares the surveillance fleet to a sales-weighted fleet. Figure 1 compares the test fleet by GVW with the 1970 factory sales by GVW.

Figures 2, 3, and 4 show examples of the varied kinds and sizes of trucks that made up the surveillance fleet.

Appendix Table A-2 lists the entire 152 trucks, with sources, engine model, GVW, etc., shown for each truck. For purposes of analysis, this fleet has been divided into 23 categories of engine make and displacement. These categories are listed in text Table 2 and described in more detail in Appendix Table A-3.

B. Engine-to-Chassis Dynamometer Correlation Group

This group of 10 trucks/engines used to check the stationary-to-chassis dynamometer correlation were selected to represent as many different makes, displacements and gross vehicle weights as possible. Emission levels were not considered when choosing trucks for this investigation. All were either 1970 or 1971 trucks, except for correlation Truck 4, which was a 1969 Dodge. This truck, while a 1969 truck, was "emission control equipped" as Chrysler Corporation equipped all of its 1969 trucks to meet the 1969 California standards. The 1969 California standards were the same as the 1970 Federal standards. Because of the time required to remove the engine from a given vehicle for testing on the stationary dynamometer, mostly rental

TABLE 1. BREAKDOWN OF SURVEILLANCE FLEET BY MAKE AND DISPLACEMENT

	Chevrolet
4	250 CID 6; all 1970
2	292 CID 6; all 1970
11	307 CID V-8; all 1970
7	350 CID V-8; all 1971
2	366 CID V-8; all 1970
2	427 CID V-8; one 1970; one 1971
28	TOTAL

	Dodge
8	225 CID 6; all 1970
15	318 CID V-8; all 1970
23	TOTAL

	Ford
3	240 CID 6; all 1970
17	300 CID 6; all 1970
1	302 CID V-8; all 1970
4	330 CID V-8; all 1970
5	360 CID V-8; all 1970
3	361 CID V-8; all 1970
4	391 CID V-8; all 1971
37	TOTAL

	GMC
5	292 CID 6; all 1970
2	350 CID V-8; all 1970
1	401 CID V-6; all 1970
8	TOTAL

	IHC
13	304 CID V-8; twelve 1970; one 1971
8	345 CID V-8; six 1970; two 1971
23	392 CID V-8; six 1970; seventeen 1971
7	478 CID V-8; four 1970; three 1971
51	TOTAL

	White
5	400 CID 6; all 1970

Grand Total	152
Number of Six Cylinder Engines	45
Number of V-8 Cylinder Engines	107
Number of 1970 Vehicles	117
Number of 1971 Vehicles	35

TABLE 2. COMPARISON OF GASOLINE SURVEILLANCE FLEET COMPOSITION TO A FLEET WEIGHTED TO 1971 ESTIMATED SALES

Category	Vehicle Make	Engine CID	Estimated 1971 National Sales (%)	Numbers in a Sales Weighted Fleet	Actual Number	Difference Actual - Sales Weighted
1	Chev.	250	2	3	4	+1
2	Chev.	292	see GMC	see GMC	2	see GMC
3	Chev.	307	4	6	11	+5
4	Chev.	350	see GMC	see GMC	7	see GMC
5	Chev.	366	2	4	2	-2
6	Chev.	427	1	2	2	0
7	Dodge	225	1	2	8	+6
8	Dodge	318	8	12	15	+3
9	Ford	240	2	3	3	0
10	Ford	300	3	4	17	+13
11	Ford	302	3	4	1	-3
12	Ford	330	7	11	4	-7
13	Ford	360	19	29	5	-24
14	Ford	361	2	3	3	0
15	Ford	391	1	2	4	+2
16	GMC	292	2*	4*	5	+3
17	GMC	350	19*	28*	2	-19
18	GMC	401	1	1	1	0
19	IHC	304	3	5	13	+8
20	IHC	345	5	7	8	+1
21	IHC	392	2	3	23	+20
22	IHC	478	<1	1	7	+6
23	White	400	<1	1	5	+4
	Ford	390	3	4	0	-4
	Chrysler	413	2	3	0	-3
	Chev.	402	2	2	0	-2
	GMC	351	1	2	0	-2
	Chrysler	361	1	1	0	-1
	IH	232	1	1	0	-1
	Chrysler	383	1	1	0	-1
	Ford	477	<1	1	0	-1
	Ford	534	<1	1	0	-1
	Chrysler	360	<1	1	0	-1
	IH	450	<1	0	0	0
	Cadillac	472	<1	0	0	0
	IH	549	<1	0	0	0

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* GMC and Chevrolet were estimated together.

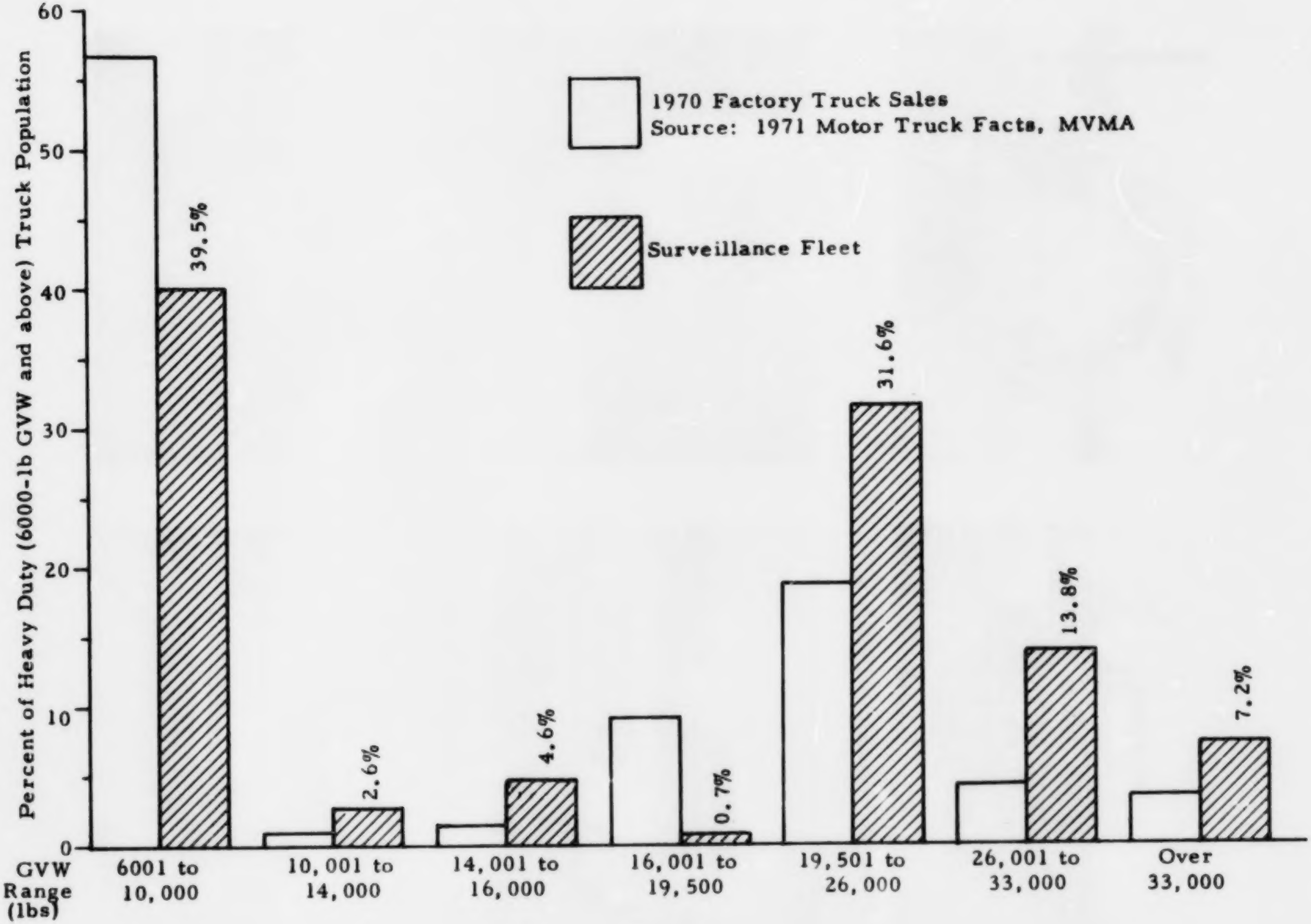
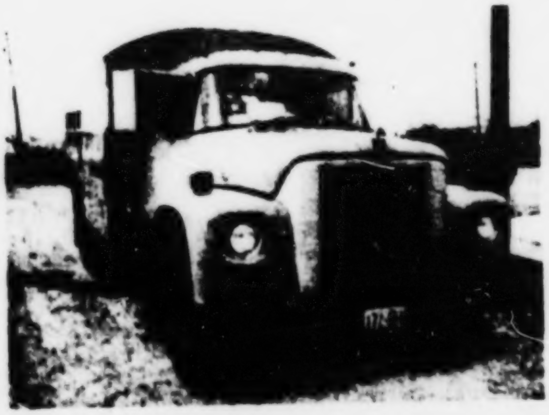


FIGURE 1. COMPARISON OF SURVEILLANCE FLEET TO 1970 FACTORY SALES BY GVW CLASS

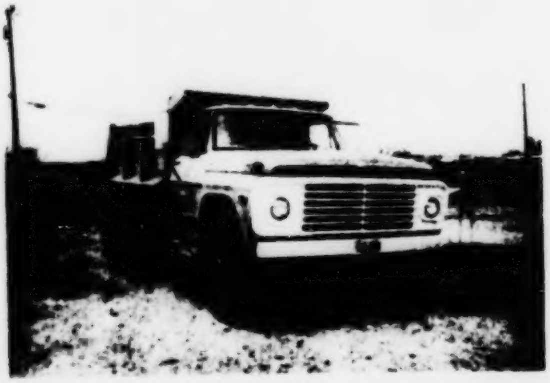
Unit 55 - 1970 IHC 304 CID V-8



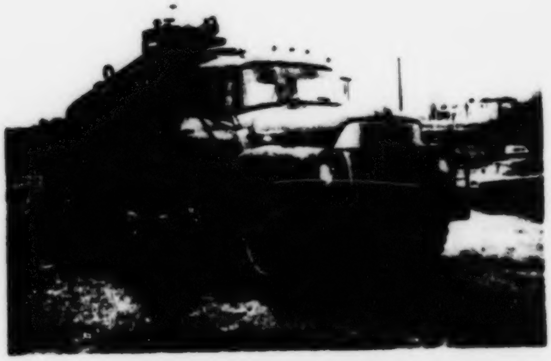
Unit 57 - 1970 IHC 304 CID V-8

Unit 60 - 1970 Chevrolet 307 CID V-8

Unit 64 - 1970 Dodge 318 CID V-8



Unit 68 - 1970 Ford 361 CID V-8



Unit 72 - 1971 IHC 345 CID V-8

FIGURE 2. EXAMPLES OF SURVEILLANCE TRUCKS

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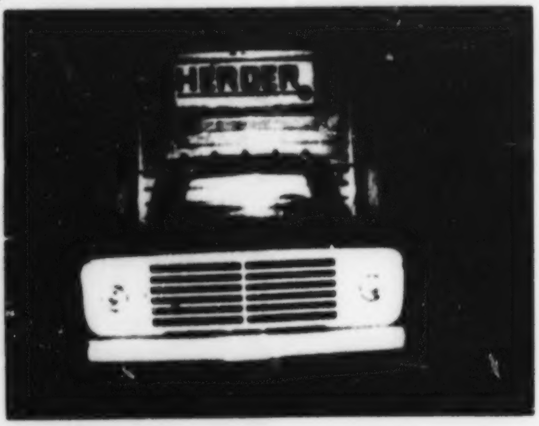
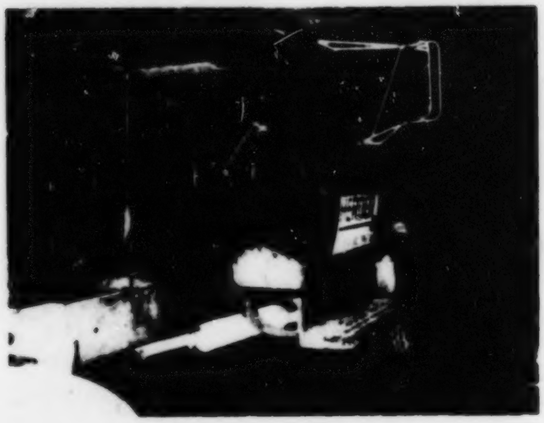
Unit 77 - 1970 Dodge 225 CID I6



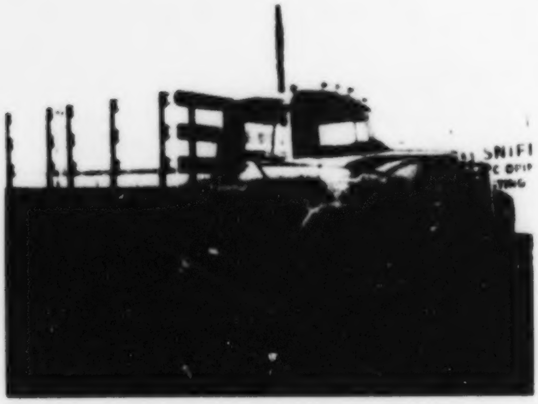
Unit 81 - 1970 Ford 300 CID I6



Unit 83 - 1970 Ford 361 CID V-8

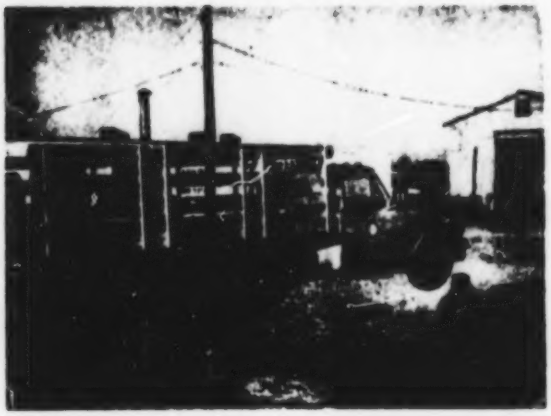
Unit 91 - 1970 IHC 345 CID V-8

Unit 101 - 1970 Ford 330 CID V-8

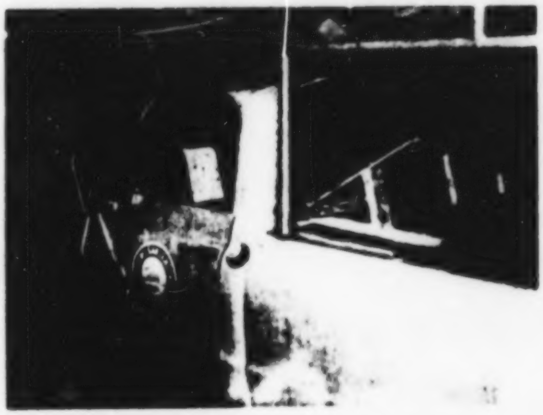


Unit 105 - 1970 IHC 392 CID V-8

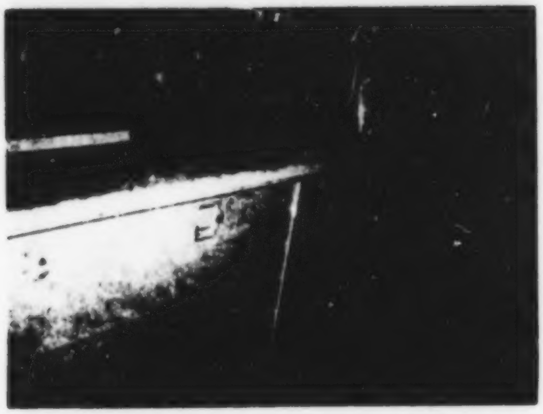
FIGURE 3. EXAMPLES OF SURVEILLANCE TRUCKS



Unit 106 - 1970 Ford 360 CID V-8



Unit 110 - 1970 Chevrolet 307 CID V-8



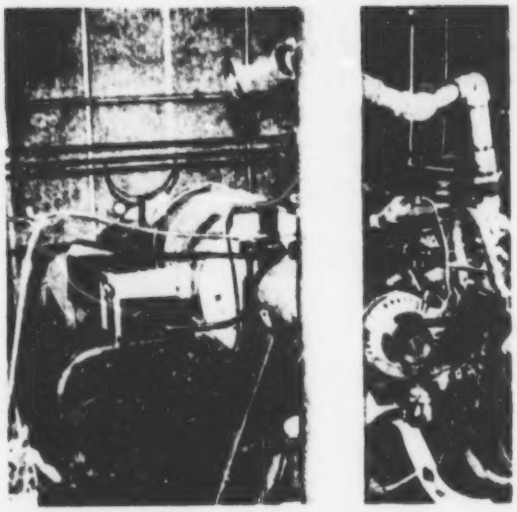
Unit 112 - 1970 Chevrolet 307 CID V-8

Unit 117 - 1970 GMC 350 CID V-8

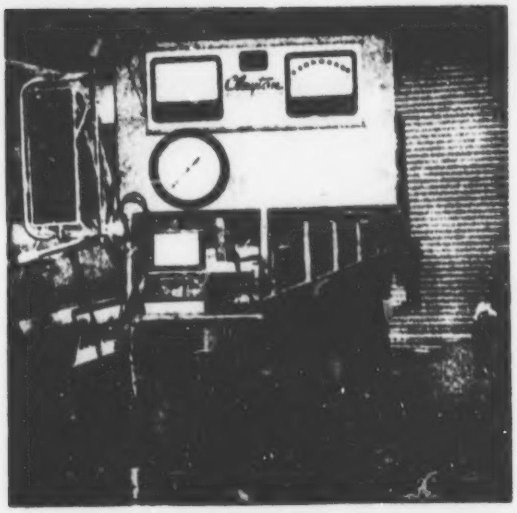
Unit 123 - 1970 GMC 292 CID I6

FIGURE 4. EXAMPLES OF SURVEILLANCE TRUCKS

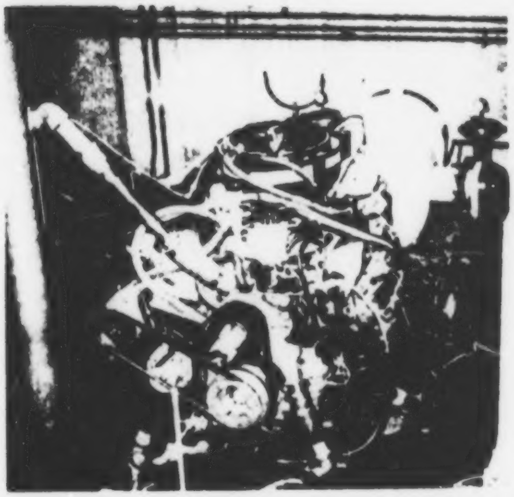
trucks were used for this part of the project. However, an attempt was made to include as many trucks from the surveillance fleet as possible. Five of the surveillance fleet, units 8, 20, 21, 94, and 144, are included in the correlation group as trucks 4, 1, 2, 9, and 8, respectively. Appendix Table A-1 describes the 10 trucks. Figure 5 shows some of the trucks and engines on their respective dynamometers.



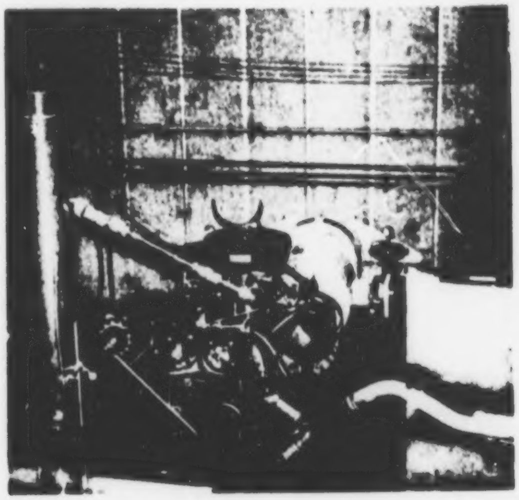
Truck No. 3 Engine, 1969 Dodge 318 CID V-8, on Stationary Dynamometer



Truck No. 5, 1971 Ford 330 CID V-8, on Chassis Dynamometer



Truck No. 5 Engine, 1971 Ford 330 CID V-8, on Stationary Dynamometer



Truck No. 7 Engine, 1970 IHC 345 CID V-8, on Stationary Dynamometer

FIGURE 5. CORRELATION GROUP ENGINES AND TRUCKS ON TEST DYNAMOMETER

III. TEST PROCEDURES, INSTRUMENTATION, AND FUEL

The two phases of this study, the surveillance phase and the correlation phase, used essentially the same test procedures and similar, sometimes the same, equipment. This section explains the test procedures and instrumentation used for both phases of the investigation and presents an analysis of the test fuel used during the two phases of testing.

A. Test Procedure

1. Heavy-Duty Gasoline Nine-Mode Federal Test Procedure

The engine-operating schedule for both the surveillance tests and correlation tests was the 1970 nine-mode Federal Test Procedure(7). The correlation tests run on the stationary engine dynamometer adhered strictly to the FTP as published in the November 10, 1970 Federal Register. The chassis dynamometer tests were run using a chassis dynamometer version of the FTP contained in the proposed Federal Standard of January 4, 1968 as an alternate to the stationary method.(8) This chassis version was deleted when the regulations were adopted and published in the June 4, 1968 Federal Register(9).

Briefly, the nine-mode FTP consists of the schedule shown in Table 3, which is run four times for a total running time of 20 minutes. The weighting factors, listed in the last column of the table, are used to calculate the concentration results. The complete Federal Test Procedure as published in the November 10, 1970 Federal Register, is included in this report as Appendix C for convenient reference.

2. Surveillance Trucks

No specific pre-test preparations were made to this group of 152 trucks for the surveillance tests. A tag was placed in the engine compartment of each truck stating the following:

> "Engine on 12 month fleet test for Southwest Research Institute. Engine to be maintained normally in accord with usual fleet practice. Please report any difficulties requiring adjustments to carburetion, ignition or internal engine maintenance to [here the name of supplier's maintenance supervisor was inserted]."

The fleet sources were also contacted personally to insure that they understood no changes in their current maintenance procedure were desired. At each test the exhaust system on each truck was inspected and repaired or tightened where required to provide a leak-tight exhaust system.

TABLE 3. 1970 FEDERAL NINE-MODE CONSTANT SPEED PROCEDURE FOR HEAVY-DUTY GASOLINE TRUCKS

Sequence Number	Manifold Vacuum	Time in Mode, sec.	Cumulative Time, sec.	Weighting Factors
1	Idle	70	70 (1:10)	0.036
2	16 in. Hg	23	93 (1:33)	0.089
3	10 in. Hg	44	137 (2:17)	0.257
4	16 in. Hg	23	160 (2:40)	0.089
5	19 in. Hg	17	177 (2:57)	0.047
6	16 in. Hg	23	200 (3:20)	0.089
7	3 in. Hg	34	234 (3:54)	0.283
8	16 in. Hg	23	257 (4:17)	0.089
9	Closed Throttle	43	300 (5:00)	0.021

Engine Speed 2000 ± 100 rpm.

An initial 5-min idle, two warmup cycles and two hot cycles constitute a complete dynamometer run.

When a truck was brought in for a surveillance test, it was placed on the chassis dynamometer and the engine checked to determine the timing, idle speed and dwell. An inlet manifold vacuum line was installed and connected to the driver's vacuum gage. At the first inspection the truck was then run at the various vacuum levels specified in the FTP and the engine speed checked using a stroboscopic tachometer to insure that the speed was within ± 100 rpm of the specified 2000 rpm with the motor pulleys used. (Dynamometer operation is explained in Section III-C-2.) The fuel line from the vehicle gas tank to the engine fuel pump was disconnected and a line installed from the test fuel tank. The engine was then allowed to soak for an hour prior to starting the test. The gas analyzers were checked using zero level gas and a known concentration gas. The exhaust gas sample probe was then placed in the tailpipe. Just prior to starting the test, the barometric pressure and wet and dry bulb temperatures were recorded. The radiator cooling fan was then started and the engine started and warmed up for five minutes as prescribed in the Federal Regulations. The nine-mode FTP was then begun. At the completion of the FTP, the sampling system was checked for hydrocarbon "hang up" and the instrument calibration rechecked.

If the engine was not within ± 3° spark timing or ± 100 rpm idle speed of the manufacturer's specifications, these items were adjusted to the specifications, the engine was allowed to cool for one hour and a second FTP run. The engine was adjusted back to its "as received" condition before returning the truck to service. The results from each nine-mode test were computed in accordance with paragraph 85.109 of the applicable Federal Regulations (see Appendix C). In addition, the composite value of NO was corrected for humidity using the correction factor developed by the Ethyl Corporation.(11)

3. Engine-to-Chassis Dynamometer Correlation Group

Each of the 10 engines tested during this part of the procedure was first checked in the vehicle to insure that it was within the manufacturers' specifications for idle speed, timing, dwell, carburetor adjustments, and compression. The spark plugs were also checked with an oscilloscope to insure that each one was firing properly. Other than to insure that the engines were tuned to factory specifications, no truck except the 1969 Dodge required any maintenance. The 1969 Dodge received new plugs, points, condenser, fuel filters, distributor and carburetor. The engine was then tuned to factory specifications. Each truck was then tested on the chassis dynamometer using the same procedure as the surveillance trucks. Several chassis FTP tests were run, with a one hour soak period between each test to verify the emission levels obtained.

The engine, without the radiator and transmission, was removed from the vehicle and installed on the stationary engine dynamometer. The same vacuum gage and exhaust gas analyzers that were used with the chassis tests were moved to the test cell for use during the stationary tests.

The engine was directly coupled to the dynamometer and used the test stand water-to-water heat exchanger in place of the vehicle radiator. The vehicle exhaust system was connected to the engine insofar as possible in the same configuration as on the truck. A mechanical-pneumatic throttle linkage was installed on the engine. The automatic data acquisition system was connected to the gas analyzers and several runs of the FTP were made to insure valid results.

The results of each of the nine-mode tests were calculated as specified in the Federal Regulations. The chassis and stationary runs were then averaged separately and the two averages compared.

B. Test Facility

With the exception of the first inspection round, all surveillance tests were conducted at the SwRI Emissions Research Laboratory. This laboratory, shown on the frontispiece, was placed in operation in April 1971 and is equipped for controlled-environment operations with the most modern means of emissions sampling and analysis.

The chassis dynamometer used for gasoline surveillance is housed in one of the laboratory high bay areas. There is ample room in this area to accommodate all instruments and the largest truck in the surveillance fleet. Figure 6 is a picture of the surveillance test area. The approximately 100 tons of air conditioning and heating are capable of maintaining the laboratory high bay area at 70° F to 75° F over the entire range of outside ambient temperature experienced in the area. Some summer humidity control is obtained with atmospheric water removal in the air conditioning system, but no other humidity control is attempted.

The stationary engine dynamometer used in the stationary-to-chassis dynamometer correlation tests is housed in test cell 3 of the U. S. Army Fuel and Lubricants Laboratory at SwRI. This laboratory is a completely-equipped engine test facility run by SwRI for the U. S. Army. Figure 7 shows pictures of the control stand and test cell area of test cell 3.

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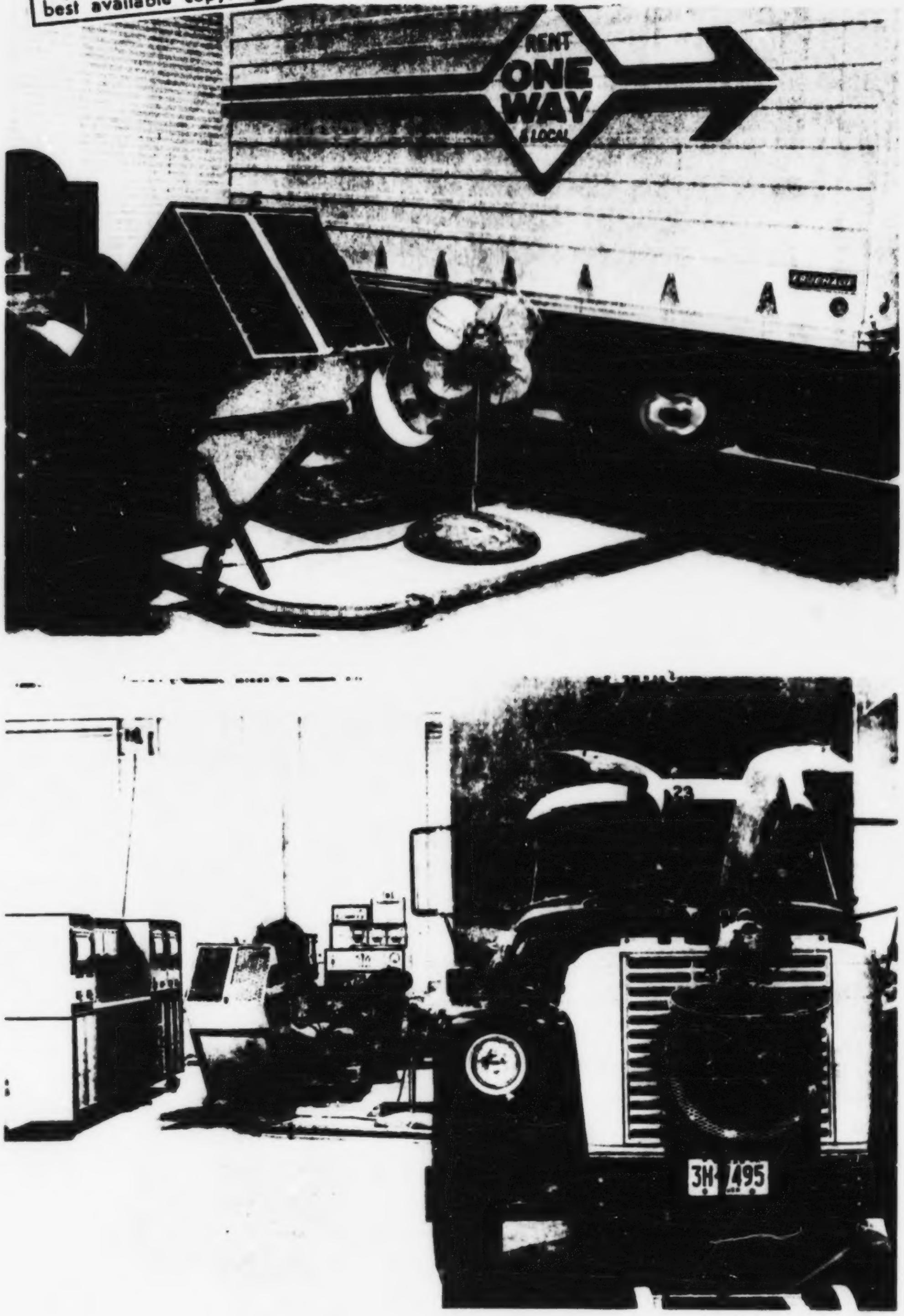
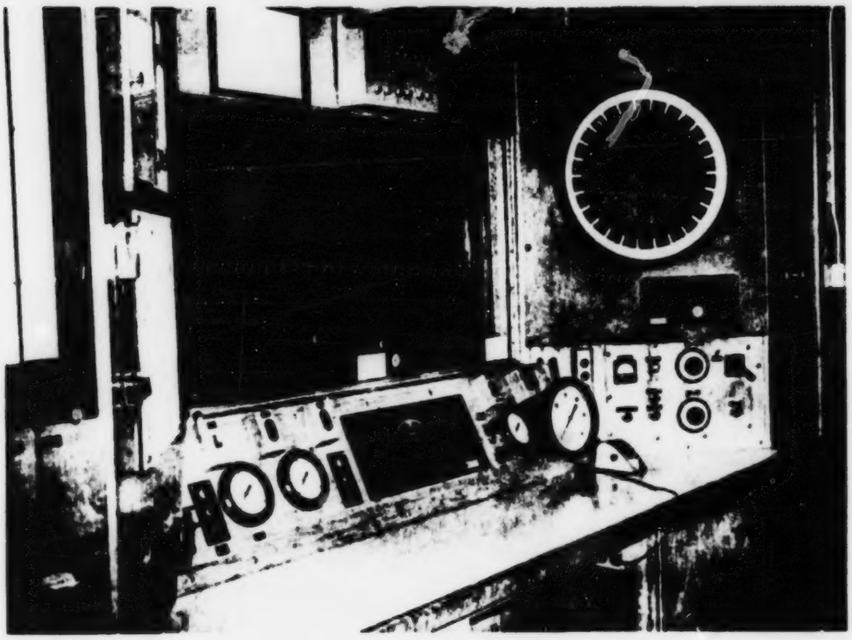
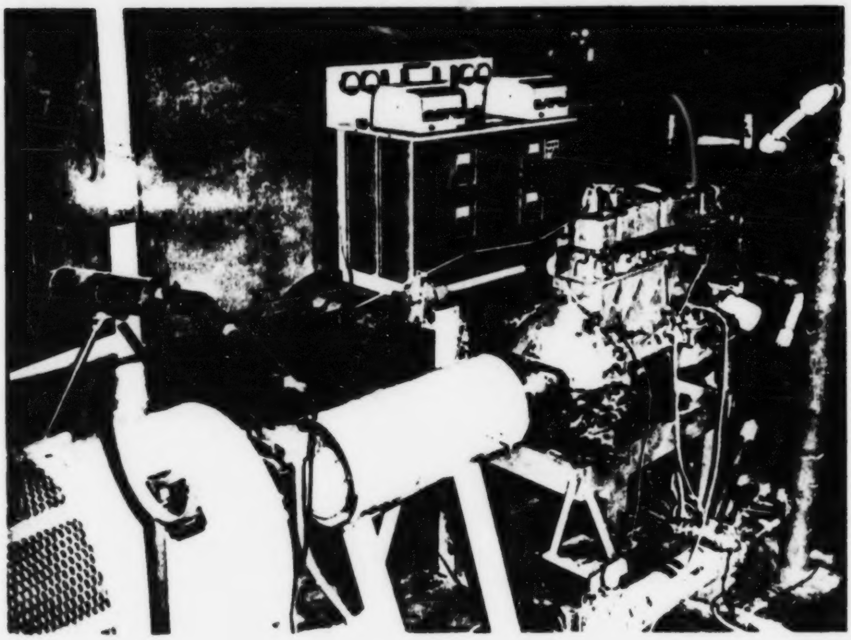


FIGURE 6. SwRI EMISSIONS RESEARCH LABORATORY HIGH BAY AREA FOR GASOLINE POWERED TRUCK TESTING



Control Console, Test Cell No. 3



Typical Engine Installation, Test Cell No. 3

FIGURE 7. TEST CELL NO. 3 U. S. ARMY FUELS AND LUBRICANTS LABORATORY, SwRI

C. Test Equipment and Instrumentation

1. Exhaust Sampling and Analysis

For the surveillance tests, gas sampling and analysis for the nine-mode FTP were accomplished using the system shown in Figure 8. This system includes a gas sampling and analysis train using Beckman non-dispersive infrared (NDIR) gas analyzers in a Beckman-built sampling system and a Data General Super Nova Computer with the necessary peripheral equipment for automatic data acquisition and processing. The NDIR sampling train meets the requirements and specifications established in the Federal regulations(7) for heavy-duty vehicle exhaust sampling. For convenience, the portions of the Federal regulations applicable to exhaust emission testing of heavy-duty gasoline vehicles, as printed in the Federal Register, are reproduced in Appendix C. A flow diagram and component description of the system is contained in this Appendix. Nominal full-scale concentration levels for the five NDIR analyzers are as follows:

1. Low-Range HC - 1000 ppm hexane
2. High-Range HC - 10,000 ppm hexane
3. CO - 11 percent
4. CO_2 - 16 percent
5. NO - 4000 ppm

Although nitric oxide was not included in the Federal regulations for gasoline HDVs at the time the surveillance activity was started, it was anticipated that it would be included in future regulations and so provided valuable information on NO levels for trucks in service prior to standards being set.

The NDIR cart was subjected to a rigorous calibration according to exacting EPA requirements. Both static and dynamic gas simulator tests were run initially on this and the similar instrumentation system used in the correlation tests by Mr. Matt Macocha of EPA during the period of September-November 1971. One of the EPA checks was to name an unknown to ± 1 percent, a difficult requirement since the basic detector is only specified to ± 1 percent by the manufacturer. Suffice to say that no tests were made until initial calibrations were satisfactorily completed and an EPA acceptance of time response obtained. Recheck of calibrations and instrument response was accomplished periodically during the course of this project by EPA. Monthly calibrations of all NDIR instruments were made throughout the surveillance period by Emissions Laboratory personnel to assure optimum accuracy. Calibrations were performed using the Emission Laboratory "Golden Standard" gases. This set of 50 gas cylinders had been transported to

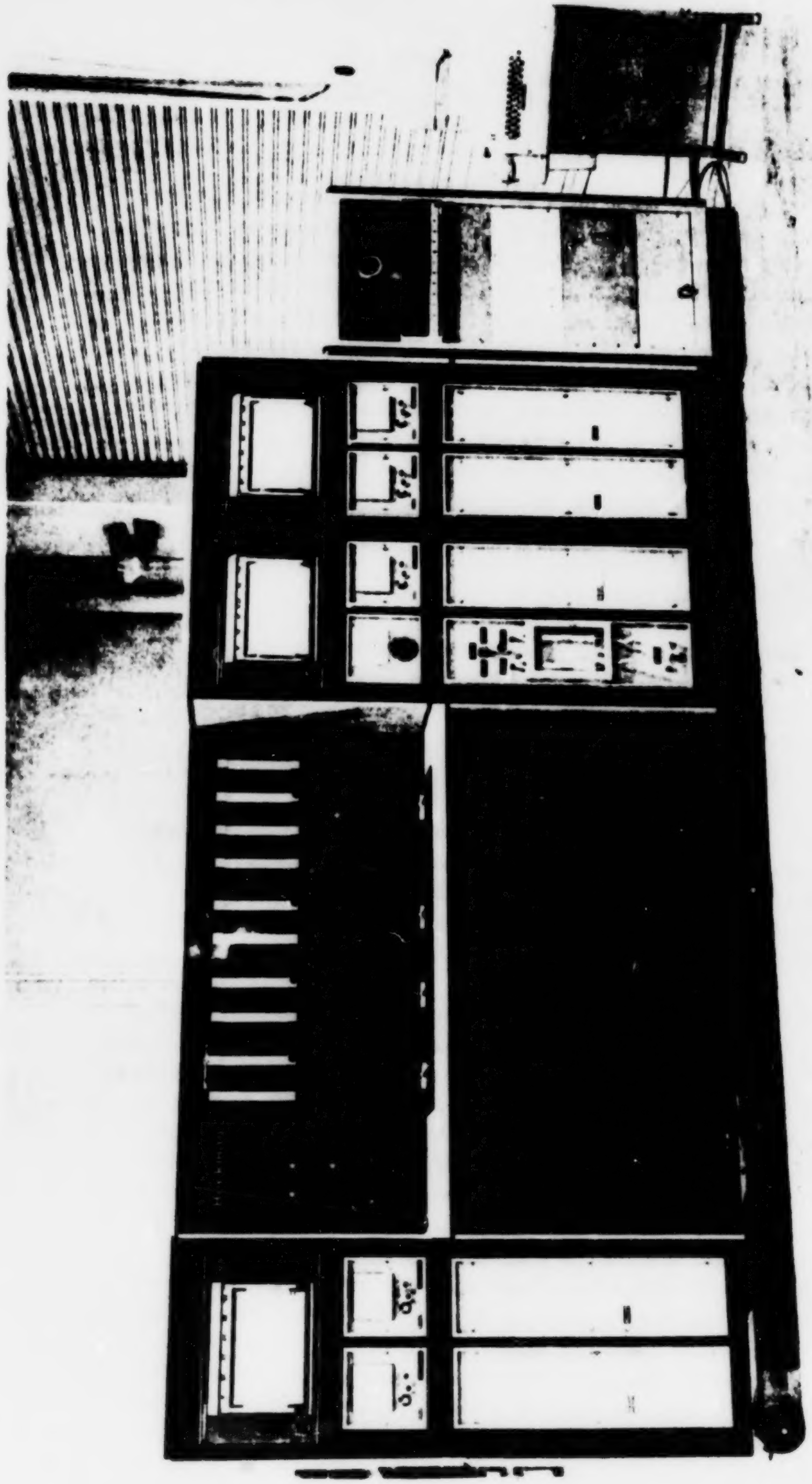


FIGURE 8. CONTINUOUS NDIR SAMPLING/ANALYSIS/ COMPUTER SYSTEM USED FOR NINE-MODE FTP TESTS

EPA laboratories and the concentrations defined to EPA standards at the beginning of the project.

The automatic data acquisition system used in conjunction with the analytical instruments was designed and assembled by SwRI. The system's main components are a Data General Super Nova computer with an 8000 word central processor, a Computer Products Series RTP7410 analog to digital converter and multiplexer, and a model ASR33 teletype. The computer programming was also done by Institute personnel. The data acquisition system accepts analog (voltage) signals directly from the NDIR analyzers, digitizes these signals and converts them to the proper units of concentration for processing to obtain the composite values of HC, CO, and NO required by the FTP.

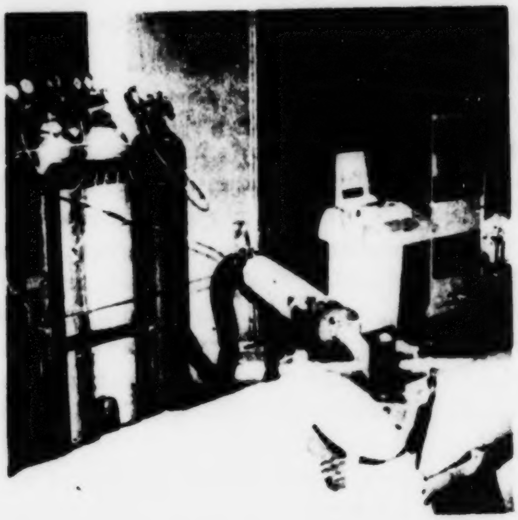
The output of each analyzer is also fed to strip-chart recorders. The concentrations of each contaminant can be obtained from the continuous traces by hand as specified in the nine-mode FTP. The average concentrations are then transferred to computer cards for further processing to obtain composite values for HC, CO, and NO. This method was used for part of the first inspection round and as a back-up to the real time data acquisition system normally used for subsequent inspection rounds. The accuracy and repeatability of the automatic data acquisition system has been shown to be equal or better than manual chart reading and computer reduction of data.

For the engine-to-chassis dynamometer correlation tests, a similar gas sampling and analysis train was used with the same automatic data acquisition system. This sampling and analysis system, which can be seen in Figure 9, used Beckman NDIR gas analyzers in a sampling system built by Scott Laboratories. This sampling train also meets the Federal requirements for heavy-duty exhaust sampling.

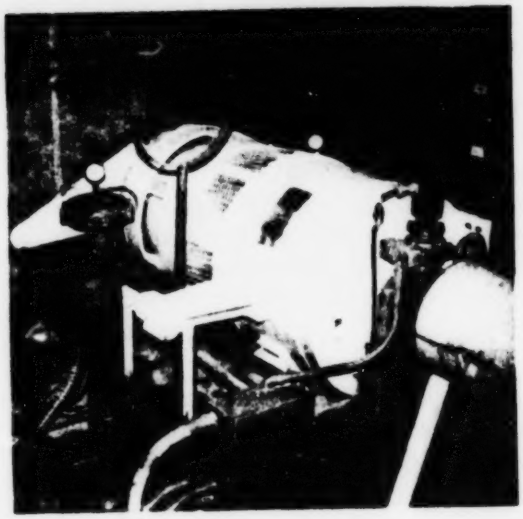
2. Chassis Dynamometer

The SwRI chassis dynamometer system used in this and previous projects is a modified Clayton CT-200 series dynamometer. Up to 200 hp may be absorbed with this water brake-type absorber. This system incorporates a 50 hp, three phase, AC electric motor that, when engaged, will maintain a nearly constant rear wheel speed during power and closed throttle (CT) operation. The electric motor is coupled to the front roll of the chassis dynamometer with a positive drive belt. The vehicle engine speed can be changed by changing vehicle rear wheel speeds either by operating in a different transmission drive gear or changing motor drive pulleys. Figure 6 shows typical views of trucks being operated on this dynamometer. The top photograph is a side view of a truck mounted on the dynamometer rolls. For the nine-mode FTP, the water brake absorber is unloaded and the load and engine speed are controlled by the electric motor.

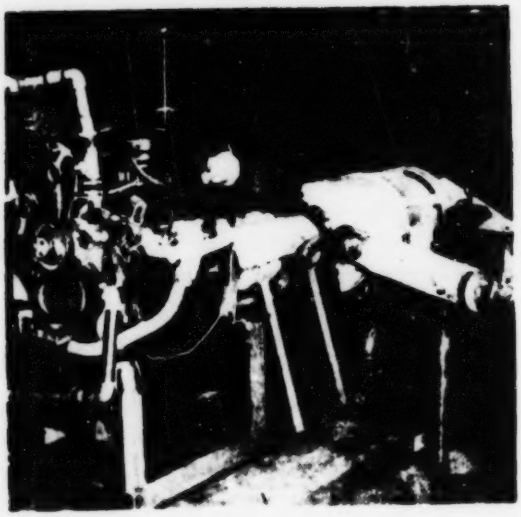
Beckman/Scott NDIR Sampling and Analysis System



Automatic Data Acquisition System



Electric Eaton Dynamometer



Typical Engine Installation

FIGURE 9. INSTRUMENTATION AND ENGINE INSTALLATION TEST CELL NO. 3, ARMY FUEL AND LUBRICANTS LABORATORY

3. Engine Dynamometer

The engine dynamometer used for engine tests in the U. S. Army Fuel and Lubricants Research Laboratory is an all electric-Eaton Dynamatic dynamometer. This dynamometer is capable of absorbing 300 hp at engine speeds from 2100 to 5000 rpm with 50 hp motoring capacity at speeds up to 3500 rpm. Figures 7 and 9 show the dynamometer and a typical engine installation

D. Fuel

The fuel used during all emissions tests, both chassis and stationary, met the requirements of the Federal Regulations(9). A typical fuel analysis of the fuel used is given in Table 4. The fuel used during the in-service operation of the vehicle was the fleet owner's usual fuel. Normally this was a regular grade, name brand, leaded motor fuel.

TABLE 4. INSPECTION REPORT OF LEADED PREMIUM MOTOR GASOLINE USED FOR ALL TESTS

Gravity, deg API (D287)	59.3
Distillation Range (D 86)	
Initial Boiling Point, °F	88
5% Point, °F	116
10% Point, °F	127
20% Point, °F	150
30% Point, °F	175
40% Point, °F	200
50% Point, °F	220
60% Point, °F	235
70% Point, °F	254
80% Point, °F	276
90% Point, °F	305
95% Point, °F	327
End Point	340
% Recovery	98.0
% Residue	1.0
% Loss	1.0
Octane No., Research (D1656)	103.4
Total Sulfur, % wt (D1266)	0.004
Reid Vapor Pressure, psi (D323)	9.1
Hydrocarbon Composition (D1319)	
Olefins, %	0.4
Aromatics, %	27.3
Saturates, %	72.3
Lead (Organic) g/gal (D526)	3.271
Phosphorus, Theory	0.0
Oxidation Stability (D525)	600+
Existent Gum, mg (D381)	0.6

IV. CORRELATION ENGINE TEST RESULTS

The results of the correlation tests are presented first since an understanding of these tests and their results is necessary for proper interpretation of the emission levels obtained from the surveillance tests. Table 5 is a summary of the average FTP emission levels obtained from the 10 correlation trucks/engines tested showing both chassis and engine dynamometer results and the percentage difference between the two types of tests. As can be seen from the table, there is no one factor that will correlate the engine and chassis tests for any of the emissions, However, with exception of the CO results from three trucks and the HC results from one of these trucks, the chassis results fall within ±25 percent of the stationary engine dynamometer results. The worst agreement is shown by the CO emissions, with the largest difference for CO being 42 percent on Truck 4. More than half of the tests showed agreement within ±15 percent. A description of the trucks tested is given in Appendix Table A-1, and the individual test results for each truck are contained in Appendix B.

The exact reasons for the differences between chassis and engine dynamometer tests are not known. A mode-by-mode comparison of the tests for each truck shows that much of the difference can be attributed to the idle, 3-inch vacuum level, and closed throttle modes. Idle and closed throttle conditions are known to be the least repeatable from test to test and this undoubtedly plays some part in the differences seen between chassis and stationary dynamometer tests. The major difference between the two test methods was in the engine operating environment. For the engine dynamometer tests, the engine was in a large ventilated room with a much different radiant heat loss characteristic than when installed in the engine compartment of a vehicle. Convective heat losses were also different since in the vehicle the engine fan and floor fan in front of the radiator provide cooling air over the engine, while there was only natural circulation around the engine on the test stand. Even though the chassis engine mounts were used when the engine was on the engine dynamometer, the engine vibration characteristics probably were different from the engine mounted in the vehicle. These vibration differences could have caused differences in carburetor operation. These ideas are offered only as possible explanations. Further investigation of the correlation problem may be desirable if certification standards continue to be based on stationary engine dynamometer tests.

Since the stationary engine dynamometer tests were run in strict accordance with Federal Regulations, they can be directly compared to the Federal standards. Figure 10 is a histogram showing the levels of HC, CO, and corrected NO for these engines. Also shown are the Federal standards for each emission type. Since only one engine, selected by chance, of each engine model represented was tested, no conclusions can be drawn about a particular engine model from these tests.

TABLE 5. SUMMARY OF CORRELATION TRUCK RESULTS
9-MODE HEAVY DUTY GASOLINE FEDERAL CYCLE
STATIONARY-TO-CHASSIS DYNAMOMETER COMPARISON

	HC - PPM - HEX.			CO. %			NO - PPM					
							Observed			Corrected		
Truck	Average Station.	Average Chassis	% Diff. *	Average Station.	Average Chassis	% Diff. *	Average Station.	Average Chassis	% Diff. *	Average Station.	Average Chassis	% Diff. *
1	161	182	13.0	1.40	1.07	-23.6	2076	1747	-15.9	2296	1735	-24.5
2	143	172	20.3	0.48	0.65	36.0	1494	1703	14.0	1600	1705	6.6
3	297	293	-1.3	4.43	3.31	-25.3	1577	1648	4.5	1567	1579	0.8
4	163	207	27.0	1.70	2.41	41.8	1624	1705	5.0	1475	1611	9.2
5	188	218	15.0	1.18	1.04	-11.8	1324	1436	8.4	1130	1318	16.6
6	129	130	0.8	1.78	1.99	12.2	926	869	-6.1	811	754	-7.0
7	257	208	-19.1	1.61	2.08	28.6	2856	2341	-21.9	2245	2207	-1.7
8	214	227	6.1	1.57	1.40	-11.1	1611	1679	4.2	1685	1395	-17.2
9	186	162	-12.9	1.01	0.90	-9.9	3506	3494	-0.6	2833	3099	9.4
10	204	245	20.1	1.34	1.44	7.3	1586	1479	-6.7	1253	1252	-0.1
Avg.	194	204	6.9	1.66	1.63	3.8	1858	1810	-1.5	1690	1666	4.1

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*Percent difference = $\frac{(\text{Chassis} - \text{Stationary})}{\text{Stationary}} \times 100$

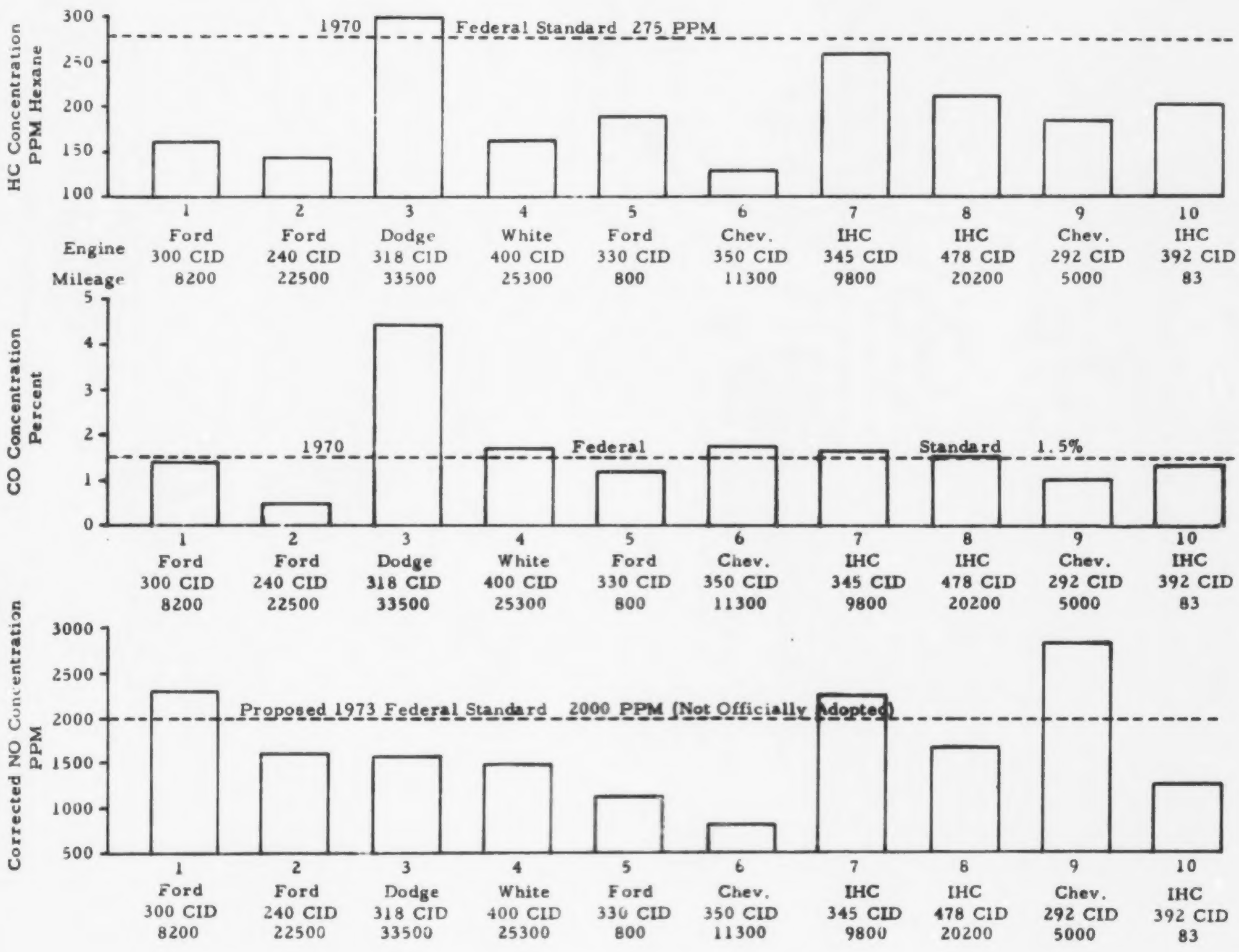

FIGURE 10. AVERAGE EXHAUST EMISSIONS FROM STATIONARY ENGINE DYNAMOMETER TESTS OF CORRELATION GROUP TRUCKS

V. SURVEILLANCE FLEET TEST RESULTS

This section summarizes the results from the two and a half years of surveillance tests on 152 gasoline powered 1970 and 1971 model year trucks in use in the San Antonio, Texas area. The results are presented by inspection round (essentially this represents time in service) and as a function of vehicle miles traveled. Analysis of the test results is presented in the next section, Section VI.

A. Results by Inspection Round

A total of seven inspections were performed on each truck. The first four inspections were at four-month intervals (0, 4, 8, and 12 months of service) and the last three inspections at six-month intervals (18, 24, and 30 months of service). In this report, the first inspection on all 152 trucks is referred to as the first inspection round or as round 1, the second inspection on all trucks as round 2, and so on.

Table 6 shows the average emission levels and the maximum and minimum levels for HC, CO, observed NO, and corrected NO for all seven inspection rounds. As can be seen from the table, the fleet average emissions for HC and CO increased over the surveillance period but observed and corrected NO remained essentially unchanged. Between the first and last inspections average HC increased 49 percent, CO increased 52 percent, while corrected NO increased 3 percent.

The arithmetical average of the HC level for the first four rounds was below the 1970 Federal Standard of 275 ppm. For the last three inspections, average HC level was above 275 ppm. For CO, the mean for each round was above the 1970 Federal Standard of 1.5% for all seven inspection rounds. There were no 1970 standards for NO. During the surveillance period a standard of 2000 ppm was proposed for 1973(10), but never adopted. Mean NO was below this value for all seven inspections. Subsequently the nine-mode procedure was changed to give results in grams per brake horsepower-hour, so that a standard for NO in terms of volumetric concentration never existed.

It should be noted that the Federal standards are used here as a convenient reference and no conclusion should be drawn from any comparisons with Federal standards without regard to the chassis-to-stationary engine test differences explained previously and to differences between the surveillance fleet and the total truck population.

The results of the surveillance inspection tests for each truck are tabulated by test round in Appendix D, Tables D-1 to D-7, for

TABLE 6. AVERAGE FLEET EMISSION LEVELS

Round	1	2	3	4	5	6	7
Number of Trucks	152	148	148	145	140	137	127
Months from Beginning of Test	0	4	8	12	18	24	30
HC-PPM n hexane							
Average	239	264	261	273	311	343	356
Maximum value	615	420	1838	2093	3906	2857	2151
Minimum value	63	139	95	120	117	104	134
Standard Deviation	66	52	149	219	386	371	381
Coefficient of Variation (%)	27.6	19.7	57.1	80.2	124.1	108.2	107.0
CO - Percent							
Average	1.61	1.73	1.89	1.79	1.95	2.16	2.44
Maximum value	5.52	6.56	11.92	4.90	7.07	8.23	8.36
Minimum value	0.26	0.31	0.19	0.15	0.22	0.35	0.41
Standard Deviation	0.81	0.88	1.19	0.85	1.03	1.21	1.51
Coefficient of Variation (%)	50.3	50.9	63.0	47.5	52.8	56.0	61.9
NO observed - PPM							
Average	1782	1880	1940	1866	1878	1892	1779
Maximum value	3985	3488	3811	4008	4047	3667	3576
Minimum value	423	434	272	439	428	317	294
Standard Deviation	646	584	588	677	650	687	717
Coefficient of Variation (%)	36.3	31.1	30.3	36.3	34.6	36.3	40.3
NO corrected - PPM							
Average	1701	1873	1911	1703	1808	1733	1749
Maximum value	3957	3314	3879	3696	3940	3311	3769
Minimum value	378	429	266	378	374	285	300
Standard Deviation	614	563	598	594	648	626	731
Coefficient of Variation (%)	36.1	30.1	31.3	34.9	35.8	36.1	41.8

rounds 1 to 7, respectively. To help grasp some of the diversity of these results, the trucks have been divided into groups by engine make and displacement and the average emission levels of each group for each inspection round have been calculated. Figures 11 to 13 are histograms of these averages for HC, CO and corrected NO, respectively. An examination of these figures shows that there is rarely a clear trend in the emission changes between rounds. These histograms do, however, show the tendency for those engine groups that are comparatively low emitters to remain low emitters and those that are high emitters to remain high emitters for any of the emissions measured.

B. Results by Odometer Miles

Since the individual vehicle mileage varied somewhat at the initial inspection and the rate of mileage accumulation varied widely, changes between inspections (which were done at regular time intervals) are not necessarily reflective of changes with mileage. To gain some understanding of the changes occurring with mileage, the inspection results for each truck were plotted as a function of odometer mileage. These plots are contained in Appendix E. While it would be desirable to have a summary of the results at regular mileage intervals, this would generally require interpolation between test points.

The curves in Appendix E use straight lines between points as strictly a visual aid. The graphs are not intended to indicate that the emissions necessarily follow a straight line between tests. In fact, it seems probable that where very large increases in emissions occur, that the change is due to some component failure, rapid deterioration, or adjustment change, and is therefore probably a step function. Maintenance, such as replacing bad points and spark plugs, is capable of producing large decreases in emissions, giving a step decrease at the mileage at which the maintenance was performed. Therefore, no attempt has been made to average emissions at mileage increments either for the fleet as a whole or for individual engine groups.

To help comprehend the emission changes with mileage, the test points for the seven inspections on each truck have been plotted in Figures 14, 15 and 16 for HC, CO and corrected NO, respectively. These scatter plots make no attempt to identify individual trucks or data trends for individual trucks. The plots show the large range of emission levels obtained at all mileages. The 1970 Federal emission standards are shown on the plots for reference purposes. From a visual inspection of these plots, it appears that the majority of the HC test levels were below the Federal standard of 275 ppm regardless of

Note: Federal standards refer to official engine-dynamometer FTP.
These vehicle tests run on unofficial chassis version of FTP.

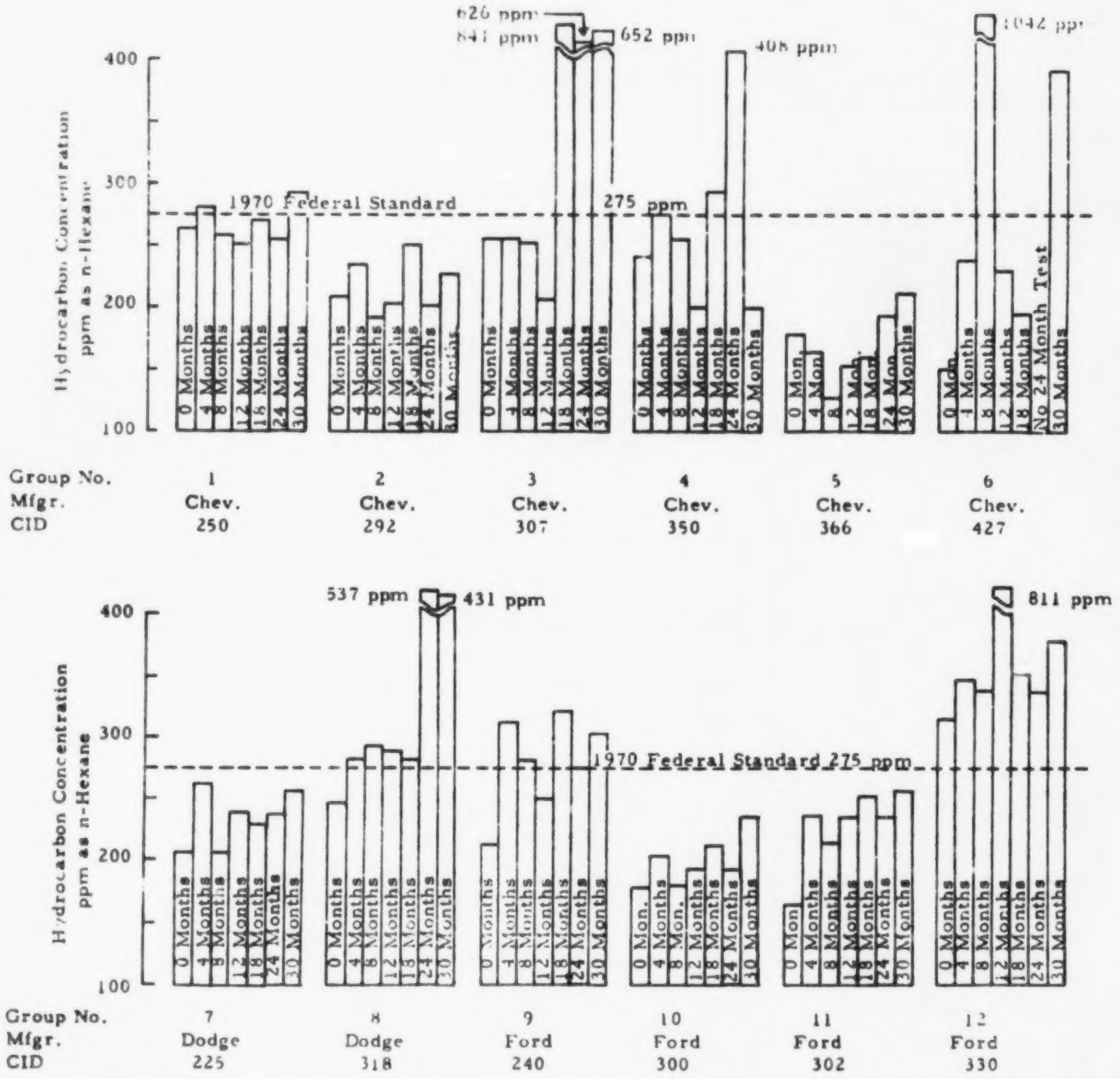

FIGURE 11. EXHAUST HYDROCARBON AVERAGE EMISSION LEVELS FOR THE 23 ENGINE MODEL GROUPS COMPRISING THE SURVEILLANCE FLEET "0" MONTHS THROUGH 30 MONTHS INSPECTIONS (Cont'd on next page)

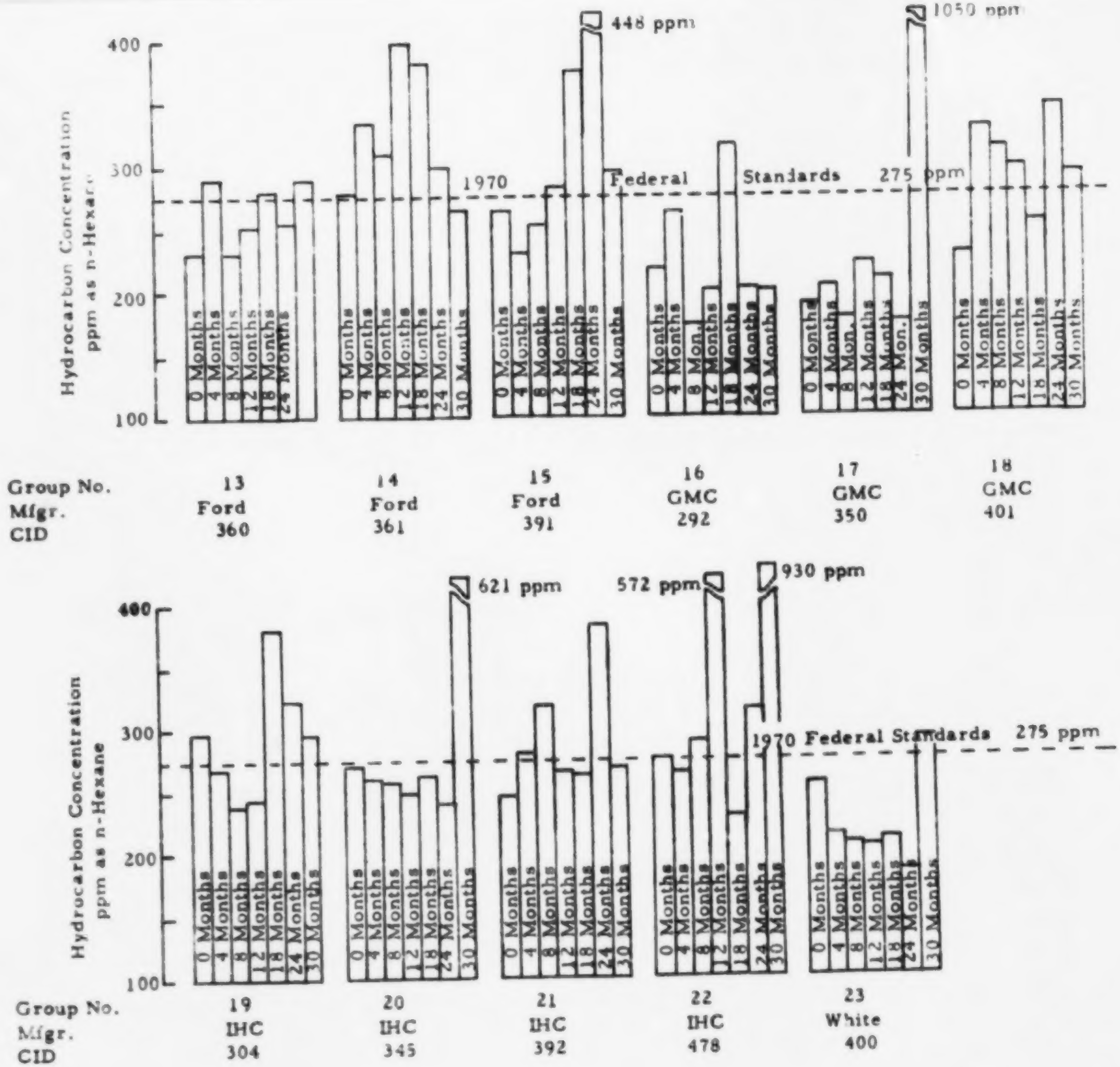

FIGURE 11 (Cont'd). EXHAUST HYDROCARBON AVERAGE EMISSION LEVELS FOR THE 23 ENGINE MODEL GROUPS COMPRISING THE SURVEILLANCE FLEET "0" MONTHS THROUGH 30 MONTHS INSPECTIONS

Note: Federal standards refer to official engine-dynamometer FTP. These vehicle tests run on unofficial chassis version of FTP.

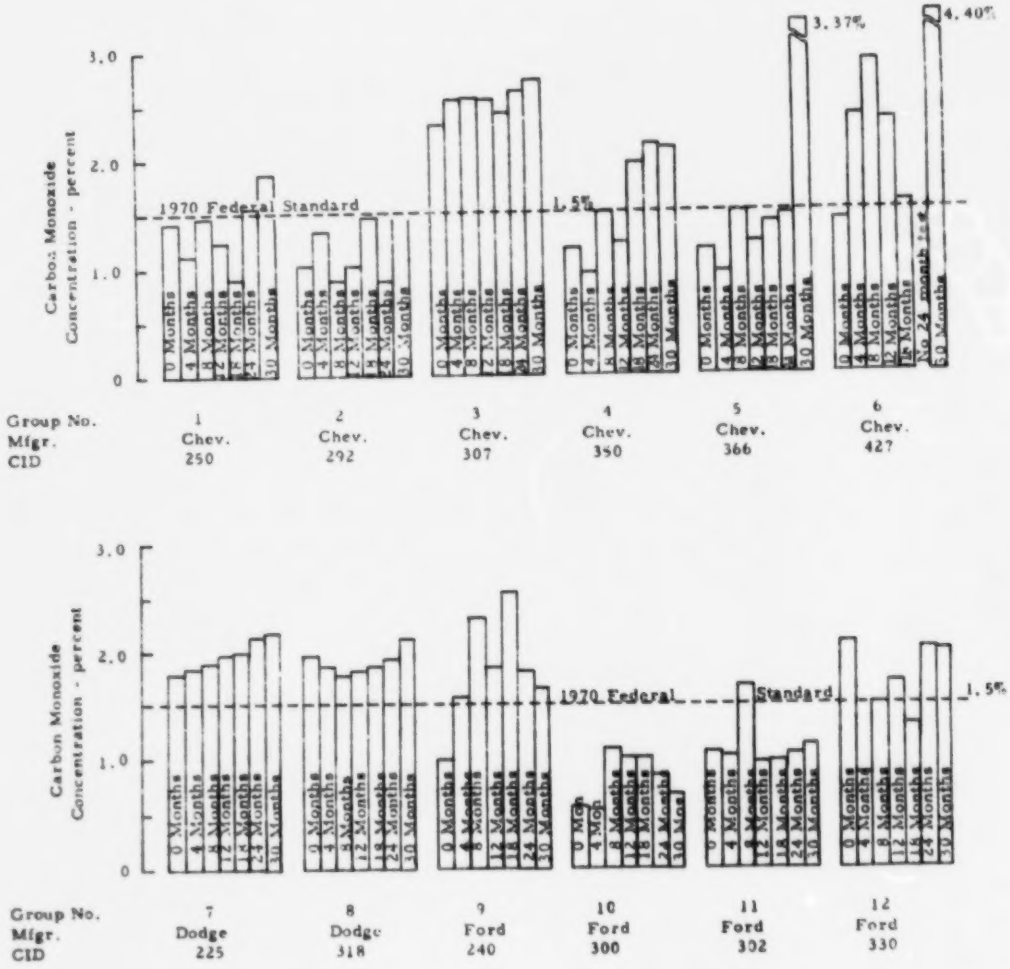

FIGURE 12. EXHAUST CARBON MONOXIDE AVERAGE EMISSION LEVELS FOR THE 23 ENGINE MODEL GROUPS COMPRISING THE SURVEILLANCE FLEET "0" MONTHS THROUGH 30 MONTHS INSPECTIONS (Cont'd on next page)

Note: Federal standards refer to official engine-dynamometer FTP. These vehicle tests run on unofficial chassis version of FTP.

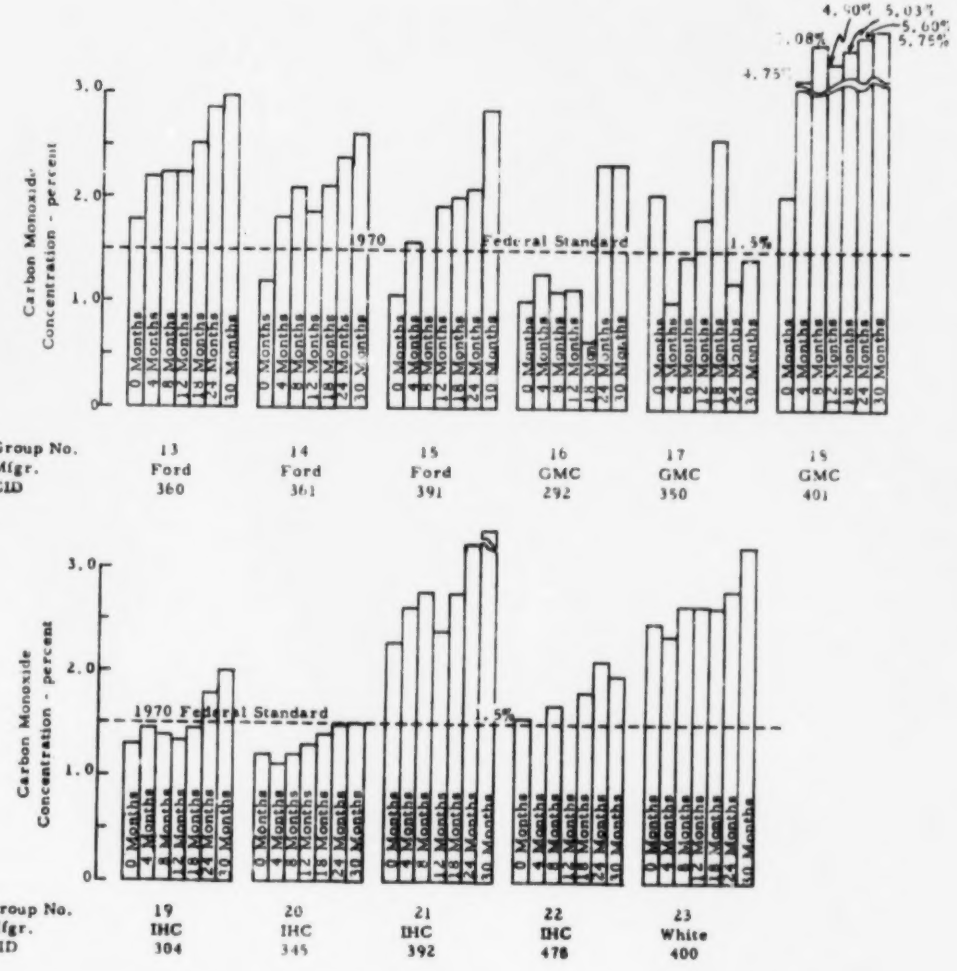

FIGURE 12 (Cont'd). EXHAUST CARBON MONOXIDE AVERAGE EMISSION LEVELS FOR THE 23 ENGINE MODEL GROUPS COMPRISING THE SURVEILLANCE FLEET "0" MONTHS THROUGH 30 MONTHS INSPECTIONS

Note: Federal standards refer to official engine-dynamometer FTP.
These vehicle tests run on unofficial chassis version of FTP.

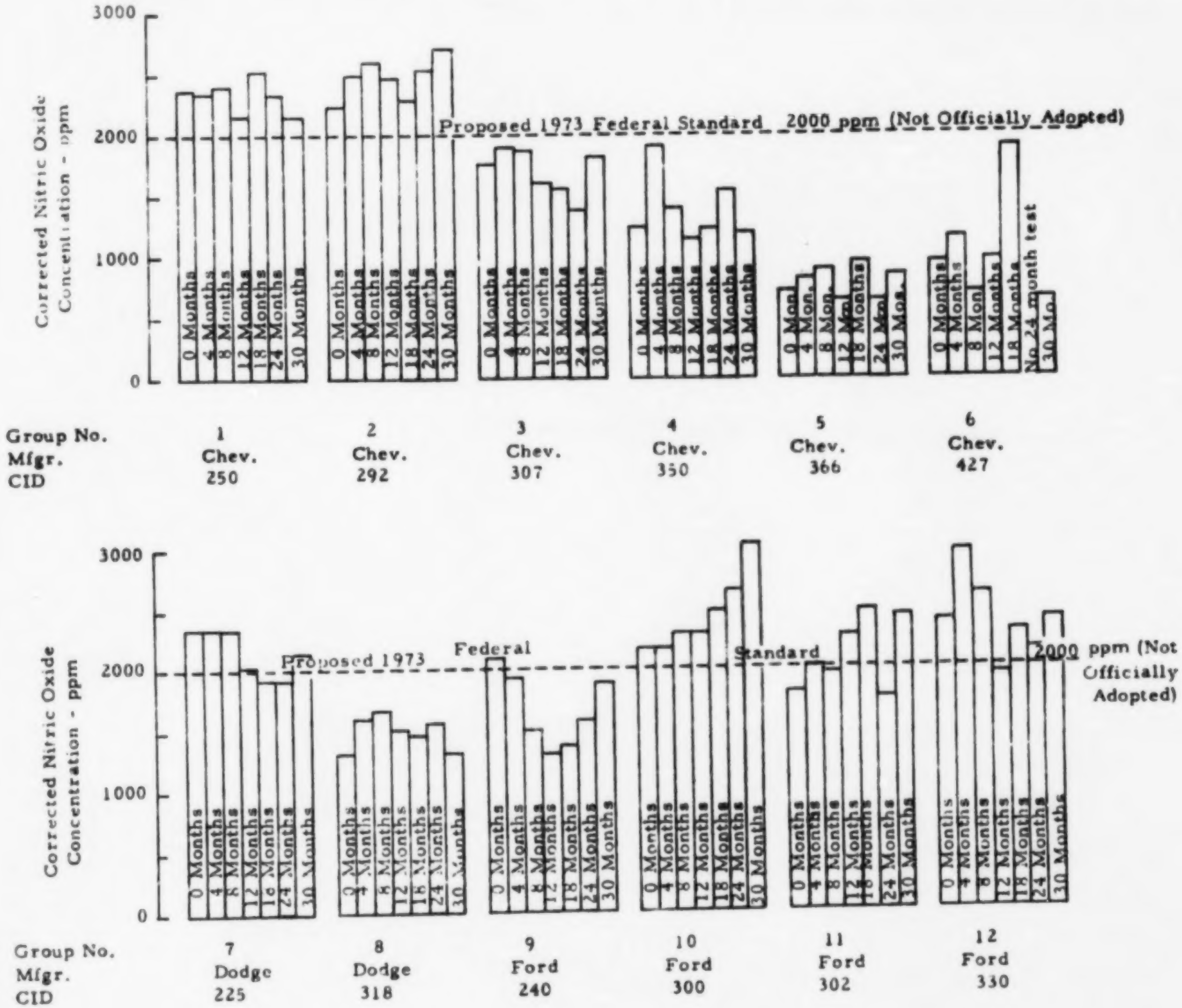

FIGURE 13. EXHAUST CORRECTED NITRIC OXIDE AVERAGE EMISSION LEVELS FOR THE 23 ENGINE MODEL GROUPS COMPRISING THE SURVEILLANCE FLEET "0" MONTHS THROUGH 30 MONTHS INSPECTIONS (Cont'd on next page)

Note: Federal standards refer to official engine-dynamometer FTP.
These vehicle tests run on unofficial chassis version of FTP.

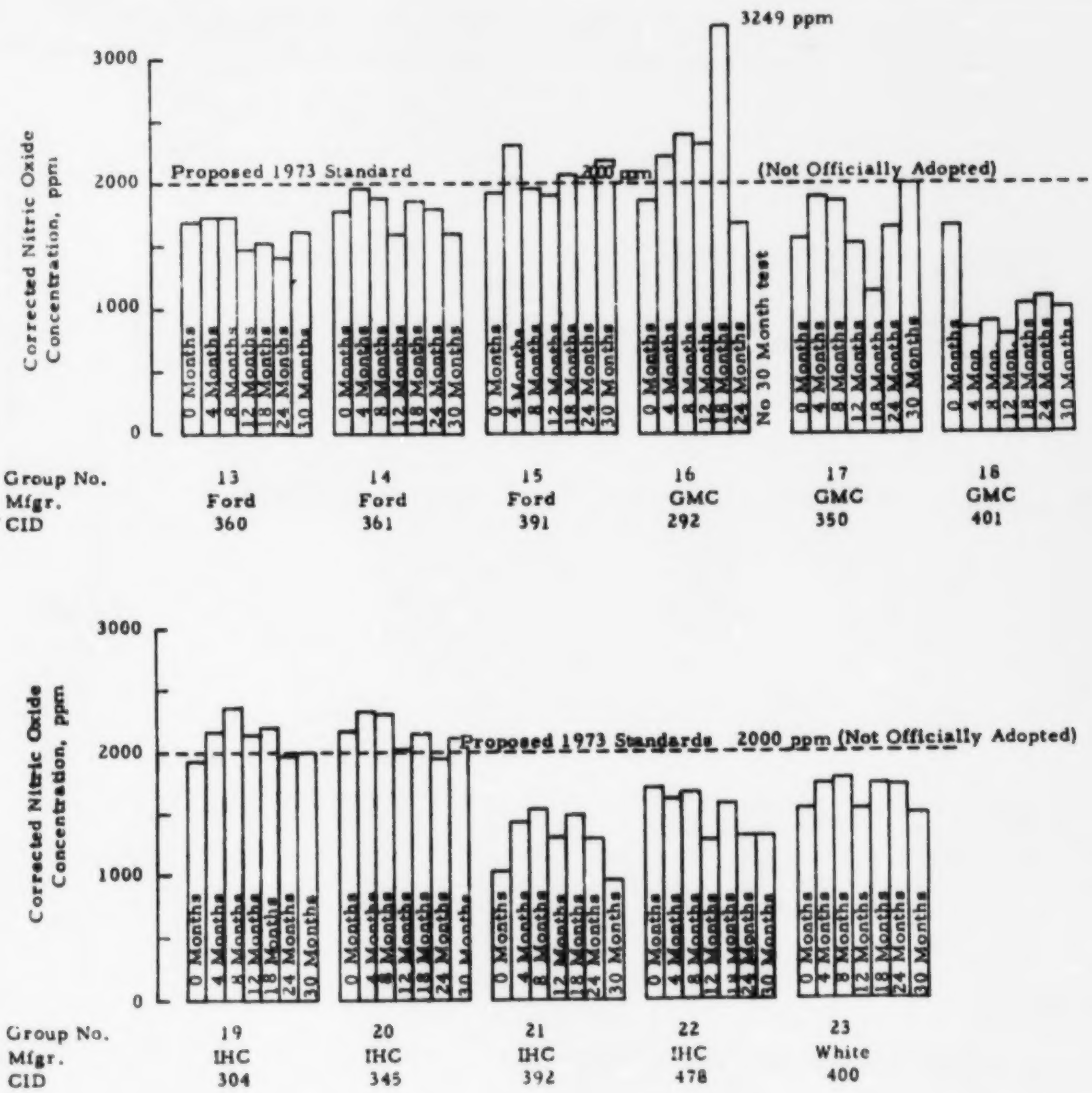

FIGURE 13 (Cont'd). EXHAUST CORRECTED NITRIC OXIDE AVERAGE EMISSION LEVELS FOR THE 23 ENGINE MODEL GROUPS COMPRISING THE SURVEILLANCE FLEET "0" MONTHS THROUGH 30 MONTHS INSPECTIONS

Note: Federal standards refer to official engine-dynamometer FTP.
These vehicle tests run on unofficial chassis version of FTP.

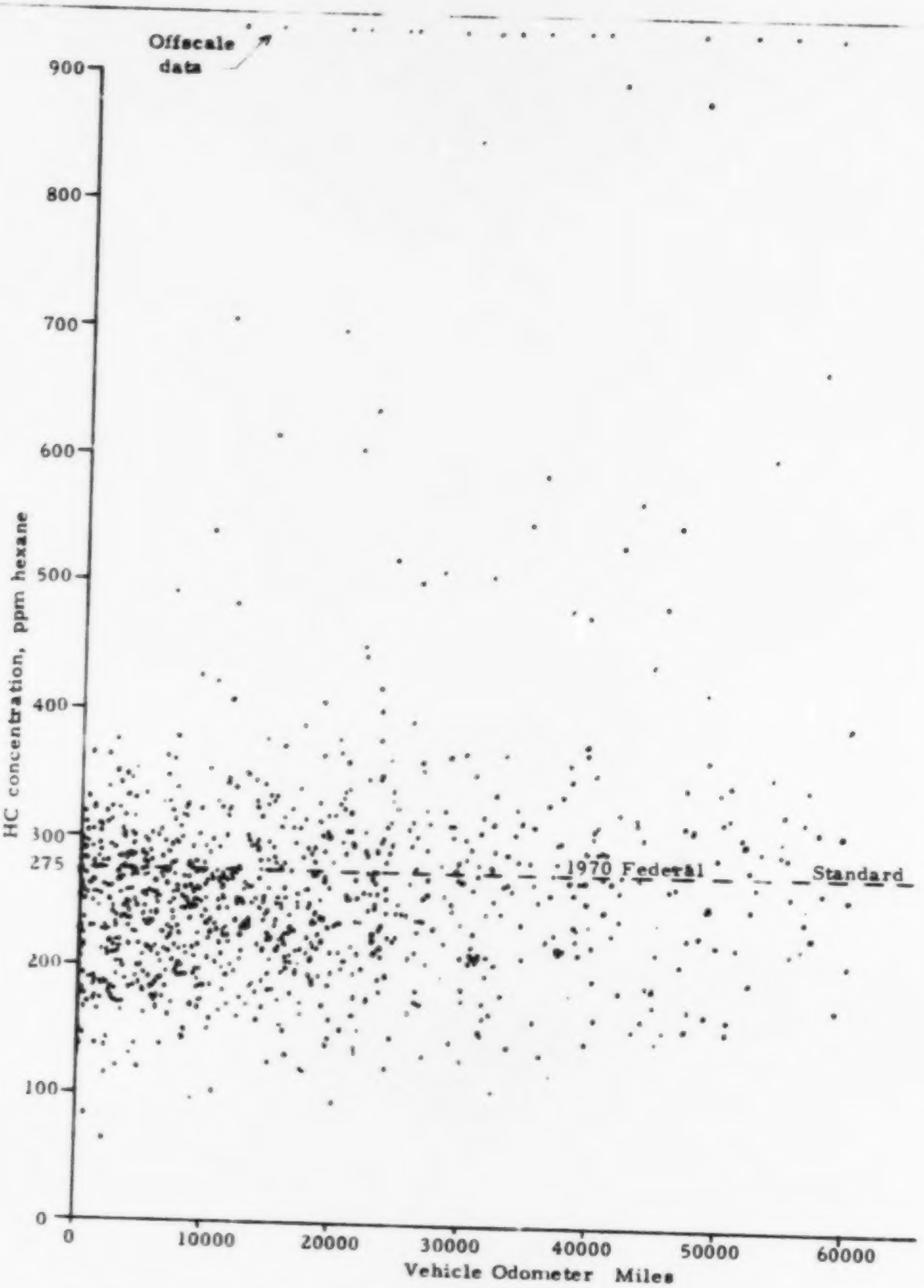

FIGURE 14. HYDROCARBON TEST LEVELS FOR ALL SURVEILLANCE TESTS AS A FUNCTION OF ODOMETER MILEAGE

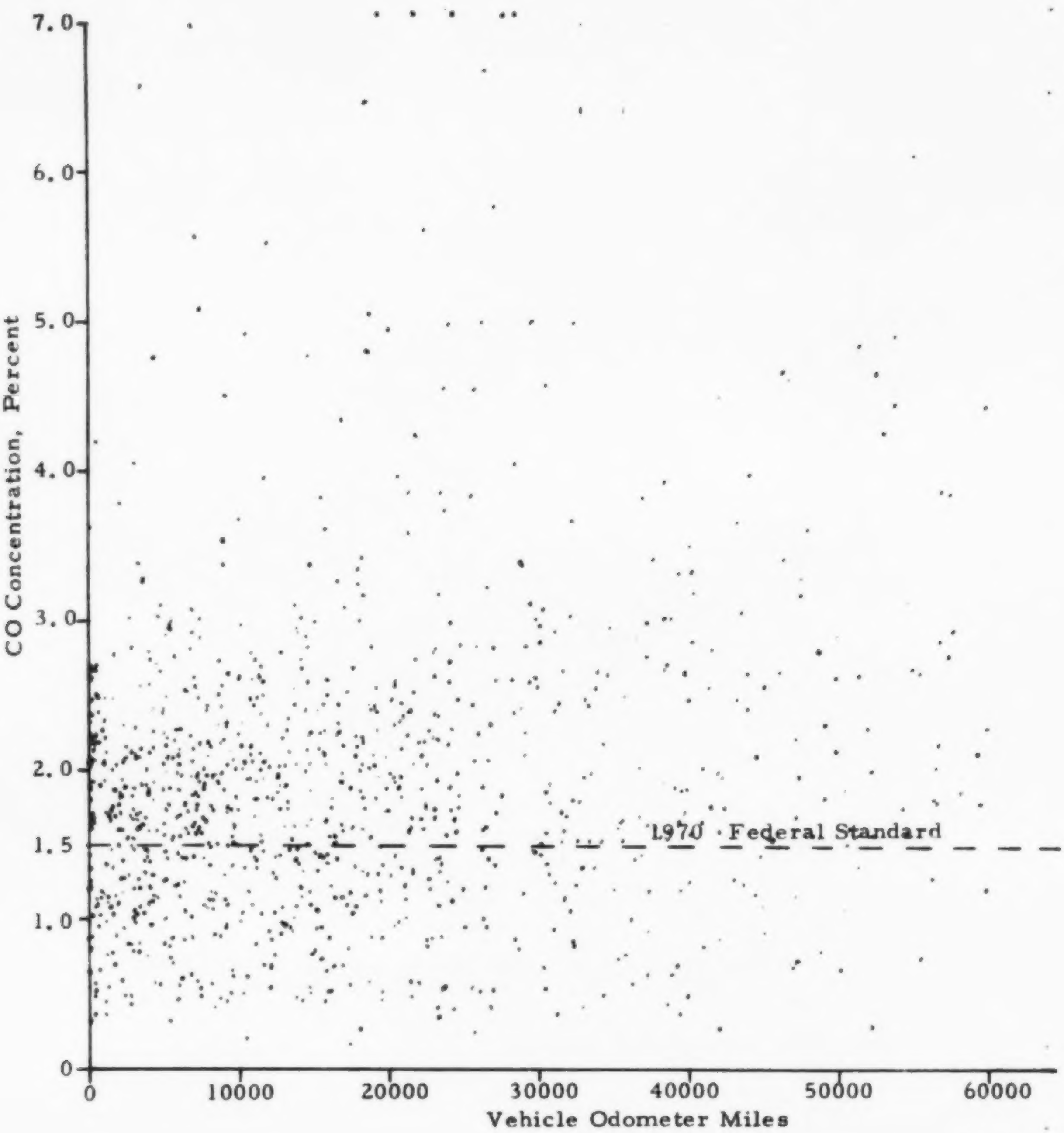

FIGURE 15. CARBON MONOXIDE TEST LEVELS FOR ALL SURVEILLANCE TESTS AS A FUNCTION OF ODOMETER MILEAGE

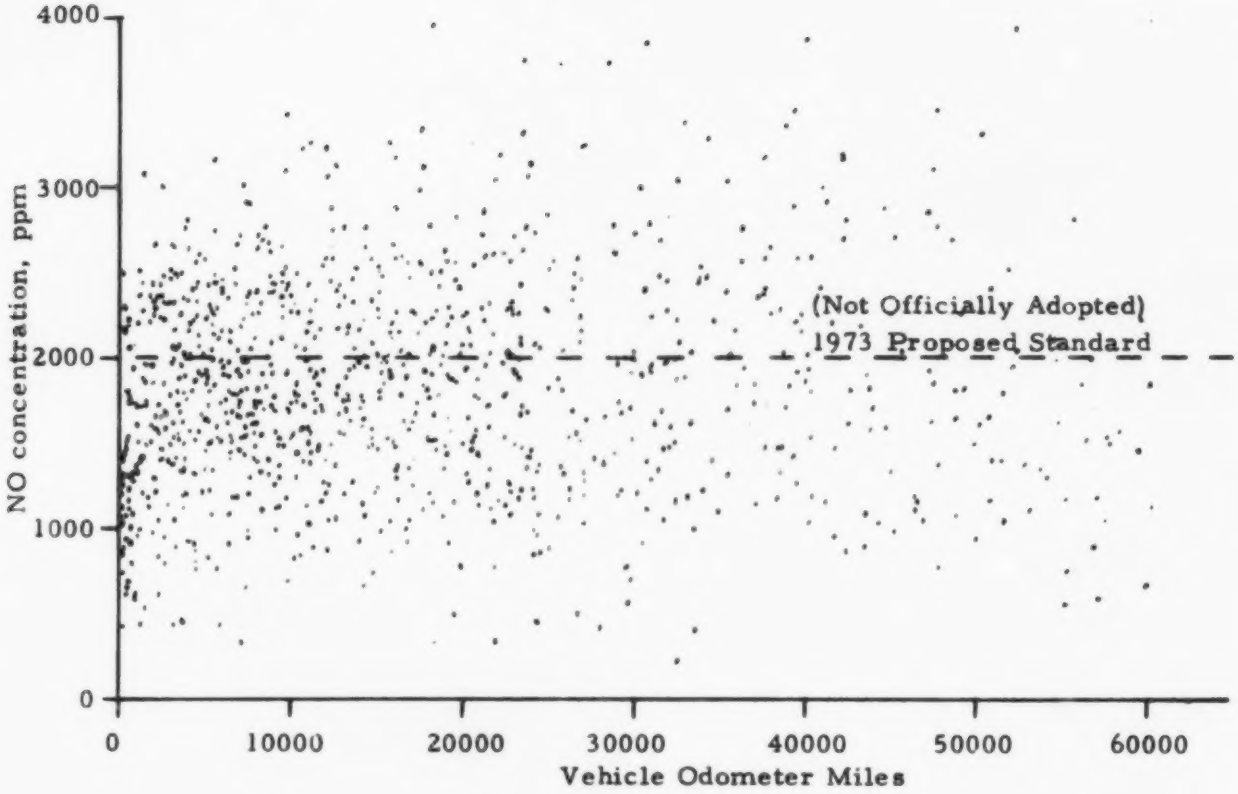

FIGURE 16. NITRIC OXIDE TEST LEVELS FOR ALL SURVEILLANCE TESTS AS A FUNCTION OF ODOMETER MILEAGE

mileage, the majority of the CO test levels appear to be above the Federal standard of 1.5 percent, and the majority of the NO test levels are below the proposed 1973 standard of 2000 ppm, regardless of mileage. The analysis of the effects of mileage on emissions is covered in Section VI-C, where these plots will again be referred to.

VI. ANALYSIS OF SURVEILLANCE FLEET TEST RESULTS

The analysis presented in this section falls into two areas. The first area was the analysis done to meet the objectives of the project. This is covered in the first three subsections. The remainder of this section is a first attempt to analyze some of the reasons behind the behavior of the test results.

A. Effectiveness of Exhaust Emission Controls

The first objective of this study was to determine the effectiveness of the exhaust emission controls on 1970 and 1971 heavy-duty gasoline trucks. To do this, the initial surveillance inspection was performed when the vehicles were new, or nearly new, and tuned to manufacturer's specifications for timing and idle speed. The fleet average results for this inspection were presented in Table 6. While this table shows the fleet average HC level was below the Federal standard of 275 ppm hexane and the fleet average CO level was above the Federal standard of 1.5 percent, this does not adequately define the effectiveness of the exhaust emission controls. To do this, the percent of trucks with emission levels below the Federal standards should be known. Figure 17 shows the cumulative frequency distribution of HC, CO, and NO for the first round inspections. Entering the graphs of HC and CO at the emission levels of the Federal standards, it can be seen that approximately 70 percent of the fleet had HC emission levels below the Federal standards; while slightly less than 50% of the fleet had CO emission levels below the Federal standard.

As explained previously, the surveillance test results cannot be compared to Federal standards on an engine by engine basis. However, it is felt that the correlation between chassis and stationary dynamometer tests is close enough that the Federal standards may be used as a frame of reference for the fleet as a whole. Thus, where the majority of the fleet falls substantially within the Federal standards it is probable that most of the engines in the fleet would meet the Federal standards if tested on a stationary engine dynamometer.

With the initial effectiveness of the emission controls determined, the next two subsections of the report deal with the second objective of the project: to establish the performance of the exhaust emission controls with time and mileage accumulation.

B. Effects of Time in Service on Emissions

While each of the trucks started the surveillance program with a slightly different time in service, it is felt that changes between

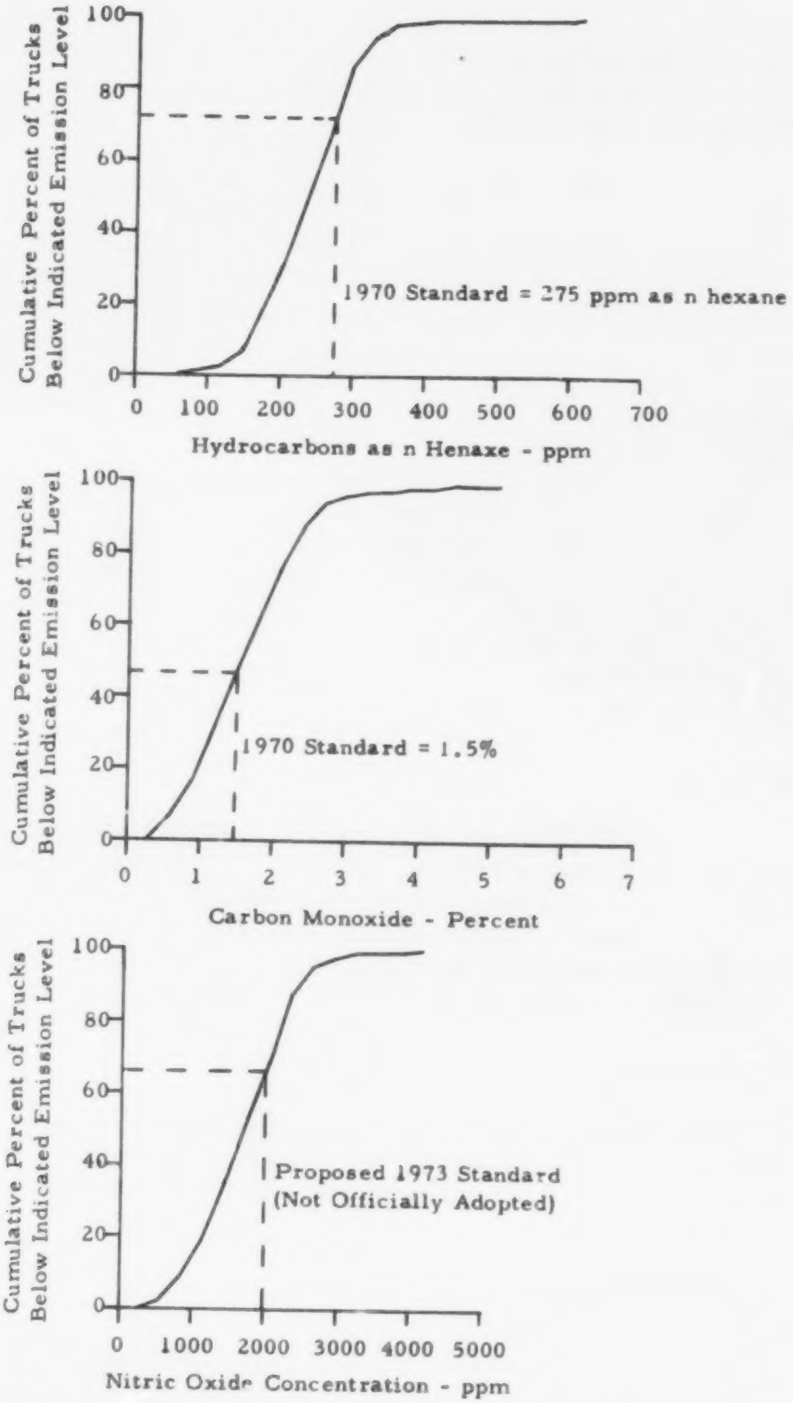

FIGURE 17. CUMULATIVE FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR FIRST ROUND INSPECTIONS (152 TRUCKS)

inspection rounds will give a satisfactory indication of the effects of time on emission levels. The trend for fleet average HC and CO emissions to increase with time has been mentioned in Section V and is easily seen in Table 6 in that section. The table also shows that there was little change in corrected NO with time.

Since the fleet average could be adversely affected by a few trucks with extremely high emission levels, perhaps a better way to understand the behavior of the surveillance fleet emissions with time would be to examine the changes in cumulative frequency distribution of emission levels from round to round, comparing the percentage of trucks below a given emission level (for instance, the Federal standards) for each inspection round. Figures 18, 19, and 20 present the cumulative frequency distribution curves for all seven inspection rounds for HC, CO, and corrected NO, respectively.

These plots show the differences in slopes and emission levels for given cumulative percentage from round to round and can be used to investigate the fleet behavior in a variety of ways. However, it is hard to compare the percentage below the Federal standard for each round using these plots. To better visualize the change with time, the percentage of trucks below the Federal standard has been plotted as a function of the nominal time in service for each test round in Figure 21 for HC, CO, and corrected NO.

There are two important conclusions that can be drawn from this graph. The first is that throughout the two and one half years of surveillance tests, the majority of the trucks continued to be within the 1970 Federal standards for HC and the 1973 proposed (but not adopted) standards for NO. However, during the surveillance period, the majority of the fleet continued to have CO levels above the 1970 Federal standards.

Secondly, it can be seen from Figure 21 that there is a definite trend in HC and CO emissions for a smaller percentage of vehicles to be below the Federal standard as time in service increases. For NO, the trend is a slight increase in the percentage of trucks with emission below 2000 ppm. Thus, part of the second objective of the study, to determine the performance of the vehicles exhaust emission controls with time in service, was accomplished. There was a slight deterioration in the ability to hold HC levels down for the fleet as time progresses and a somewhat larger effect on CO levels with time, with no such effect on the NO levels with time.

It is felt that any increase in HC and CO exhaust emission levels was the result of general engine deterioration and not the result of a

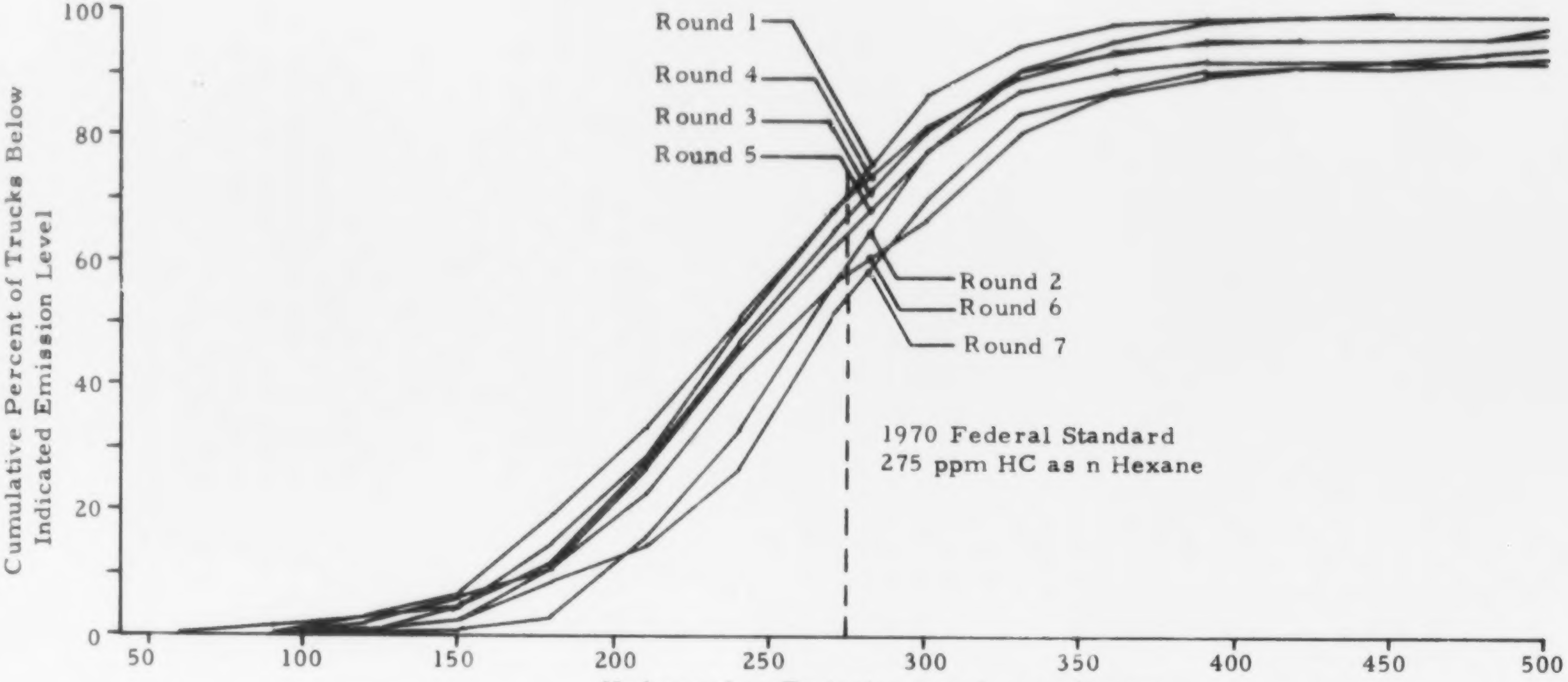

FIGURE 18. CUMULATIVE FREQUENCY DISTRIBUTION OF HYDROCARBON EXHAUST EMISSIONS FOR ALL INSPECTION ROUNDS

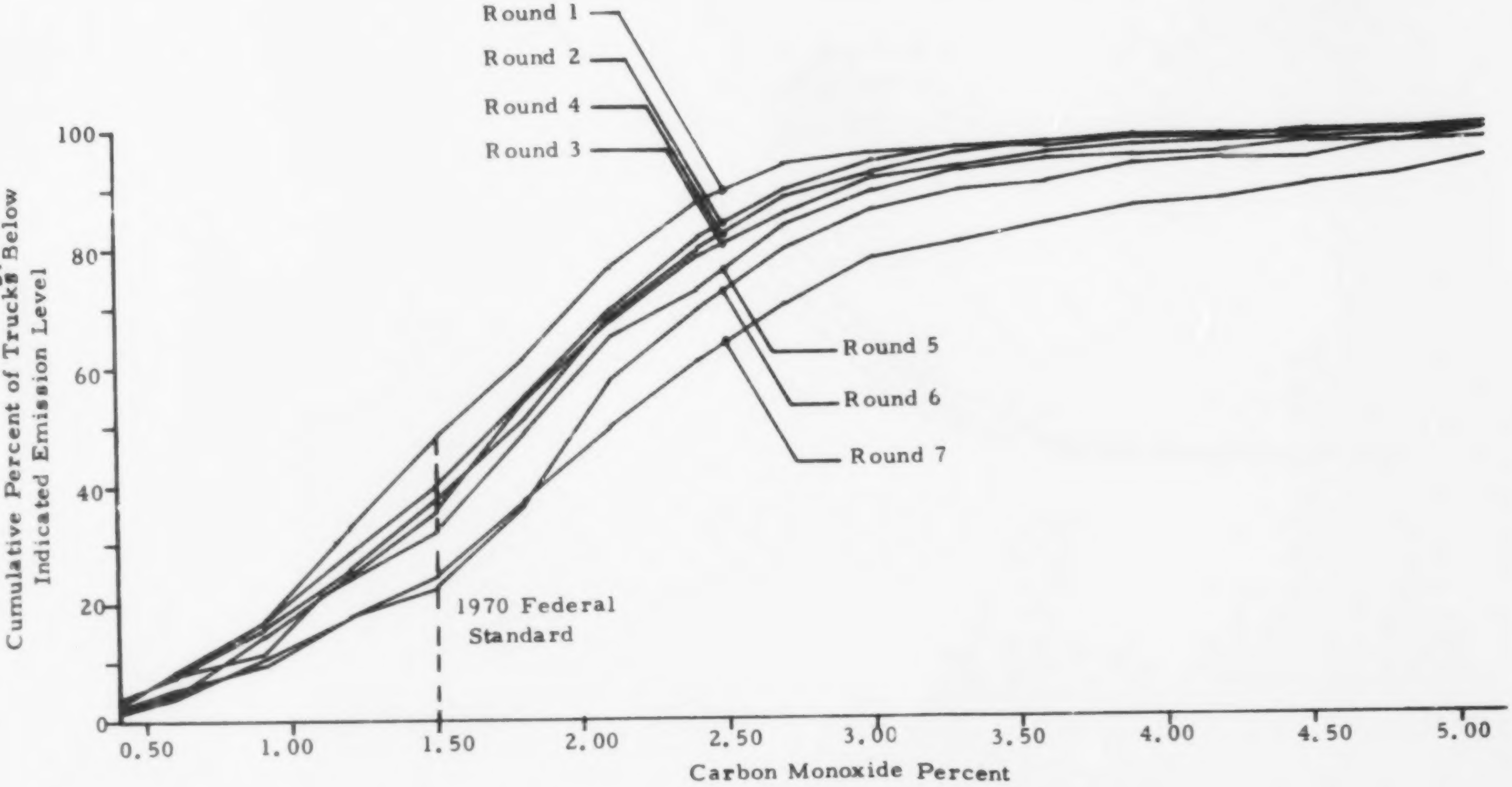

FIGURE 19. CUMULATIVE FREQUENCY DISTRIBUTION OF CARBON MONOXIDE EMISSIONS FOR ALL INSPECTION ROUNDS

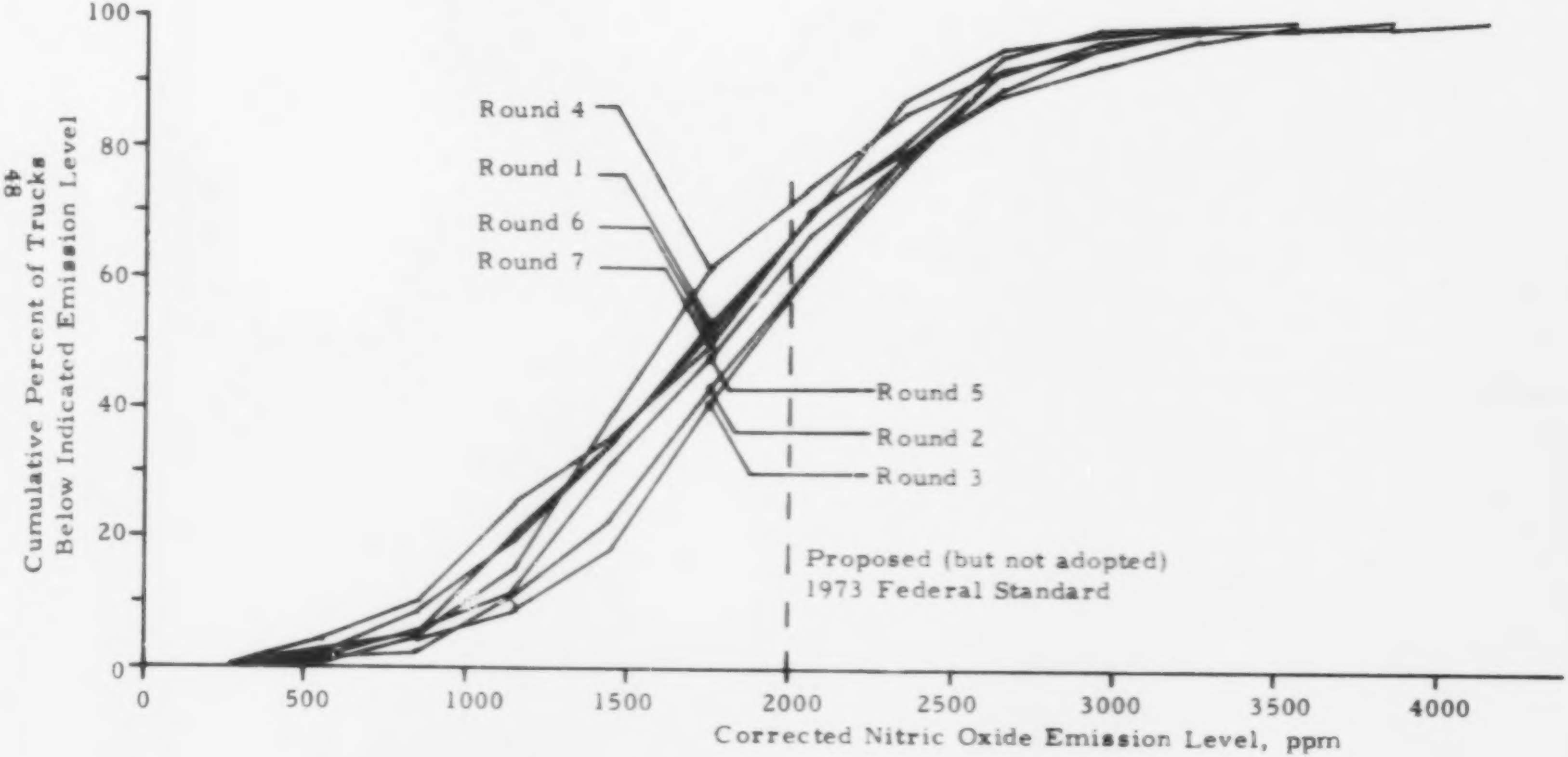

FIGURE 20. CUMULATIVE FREQUENCY DISTRIBUTION OF CORRECTED NITRIC OXIDE EMISSIONS FOR ALL INSPECTION ROUNDS

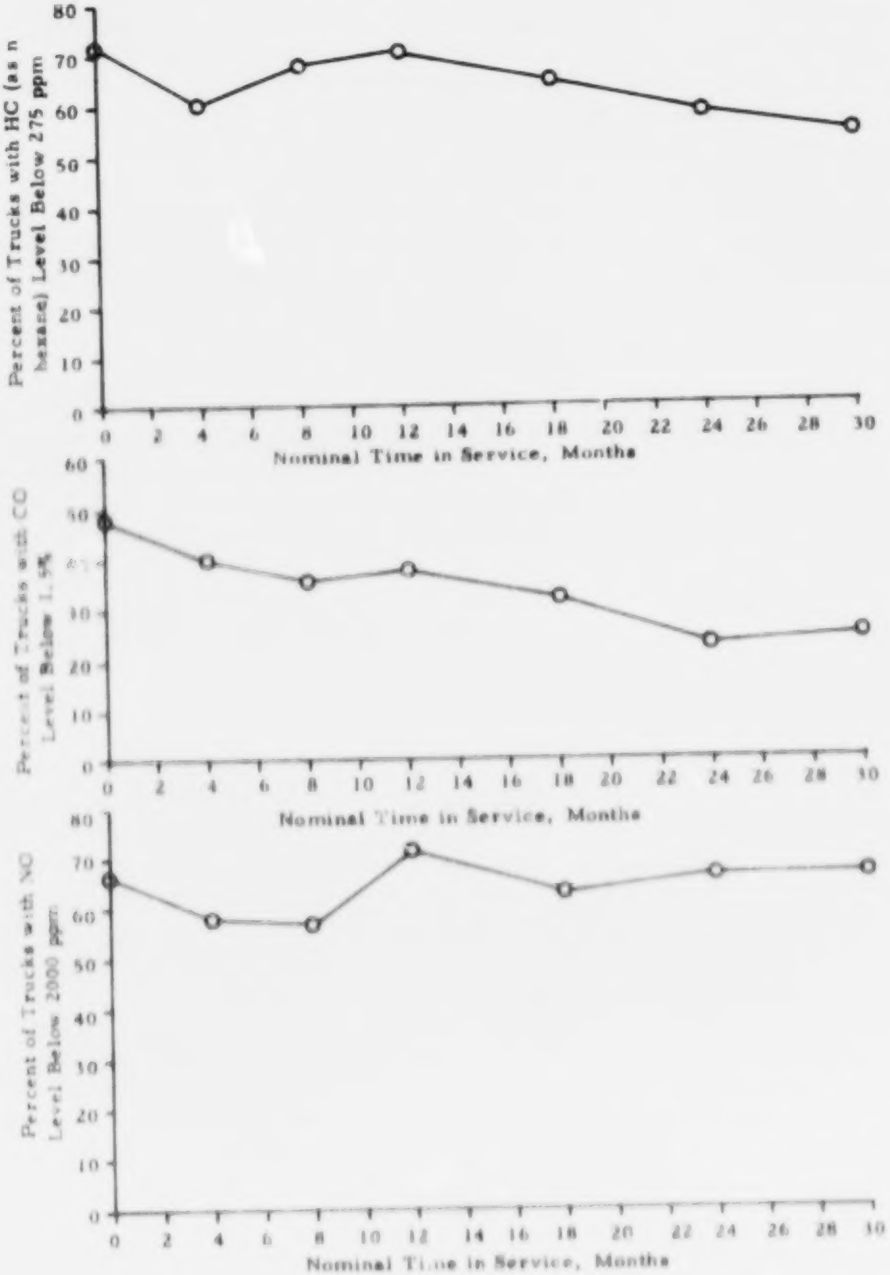

FIGURE 21. PERCENT OF TRUCKS WITH EMISSION LEVELS BELOW FEDERAL STANDARDS AS A FUNCTION OF TIME

particular exhaust emission control "device". The air injection system was the only external add-on exhaust emission control device used on trucks of the model years tested, and it was used on only a few models. Most trucks obtained the exhaust emission control required by ignition system and carburetion adjustments. This premise is reinforced by the fact that the percent of trucks with NO emission levels below 2000 ppm increases with time in service (i.e., NO levels are decreasing slightly). Thus, with deterioration of the engine and its subsystems as indicated by increased HC and CO, combustion efficiency decreased with the expected effect of lessening NO emissions.

C. Effects of Mileage on Emissions

The test results as a function of mileage were given in Section V-B. The scatter plots in that section, Figures 14 to 16, showed no obvious trends with mileage. A linear regression analysis was performed on HC, CO, NO and corrected NO results to determine the correlation between mileage and emission level. The correlation coefficients are shown below.

	Emission			
	HC	CO	NO	Corrected NO
Correlation Coefficient with Mileage	.17	.15	.05	.05

Recalling that a perfect correlation would give a correlation coefficient of 1.00, it appears that the correlation coefficients obtained are small enough to conclude that there is no relationship between emission level and mileage for the fleet as a whole. However, emission levels have been shown to vary widely between engine groups and the possibility exists that emission changes with mileage may vary from engine group to engine group. Thus the emission level and mileage plots for the whole fleet may mask changes occurring within engine groups.

An effort was made to define emission changes with mileage in a more exact manner for each engine group. To do this, a method of normalizing the emission test results was developed. This method allows the use of each individual truck's results with all other trucks in an engine group, despite large differences in absolute levels of emissions from truck to truck. A computer program was used to calculate the percentage change of each of the three pollutants versus total mileage for each vehicle within an engine model group. This percentage change was based on a common mileage for each engine group and was defined as the highest mileage for any vehicle in the group at the time of the initial test round. This definition was chosen to avoid having to extrapolate data trends, since all vehicles would eventually reach the base mileage. The computer program first finds the equations of the straight lines joining the emission results from the seven inspection tests for each truck within a given engine group. This is done for HC, CO, observed NO, and corrected NO. The resulting six equations for the six lines connecting the seven data points were used to calculate the emission values at the base mileage for each vehicle. The percentage differences between these base emission values and the emission results from each round of testing were then calculated. A sample calculation for one engine group is included in Appendix F.

This analysis was completed for all engine model groups, even if all trucks in the group did not reach the base mileage by the last inspection round. In the eventuality that any truck had not reached the base mileage by the last inspection round, either the truck that had not reached the base mileage was not included or the truck whose first test mileage was used as the base mileage was deleted to lower the base mileage, whichever resulted in the fewest trucks being dropped from the analysis. Where a truck was out of specification for timing and idle speed when tested and then tested "in spec", the "in spec" test results were used for this analysis to eliminate one of the variables that affect emission levels. Plots of these percentage differences in emissions versus odometer miles for all engine groups are presented in

These plots again emphasize the difficulty in arriving at specific conclusions about emission level changes with mileage. However, some generalizations can be made. First, the magnitude of changes is generally within -40 percent to +60 percent of the base value. Hydrocarbons exhibit the largest number of changes over 100 percent. Nitric oxide has the fewest changes over 100 percent. Secondly, some conclusion about the direction of change can be made. For HC, most of the engine groups have results either predominately higher or have an equal number of tests higher and lower than the HC level from the minimum mileage.

For CO, most of the engine groups have results that are predominately higher than the CO level at the minimum mileage for the engine group. This is the most evident conclusion from the analysis that as mileage increases, CO levels become generally higher than initial levels though the CO levels do not necessarily change in a predictable fashion. For NO, the engine groups showing an equal number of data points above and below the level at the minimum mileage point and those groups showing predominately decreasing levels are about equal in number.

Lastly, some of the engine groups do exhibit definite trends with mileage for some of the emissions considered. While these trends were not subjected to a rigorous analysis, a visual inspection was made and a judgment as to the magnitude and direction of the trend given. Table 7 presents the results of this visual inspection. As can be seen from the table, for the majority of the engine groups that showed some

TABLE 7. ENGINE MODEL GROUP EMISSION TRENDS WITH MILEAGE

Engine Model Group Number	No. of Trucks in Group	Emission Trend With Mileage		
		Hydrocarbons	Carbon Monoxide	Corrected Nitric Oxide
1	4	No change	No trend	No change
2	2	No change	No trend	Increased slightly to 25,000 miles, then decreased to 50,000 miles
3	11	No trend	Increased greatly from 0 to 50,000 miles	No change
4	7	No trend	No trend	Increased slightly from 0 to 25,000 miles, then decreased to 50,000 miles
5	2	No trend	No trend	No trend
6	2	No trend	No trend	Increased moderately fron 0 to 25,000 miles, then decreased moderately to 50,000 miles
7	8	No trend	Increased moderately from 0 to 25,000 miles	No trend
8	15	No trend	Increased slightly from 0 to 25,000 miles, then decreased slightly to 50,000 miles	No trend

TABLE 7 (Cont'd). ENGINE MODEL GROUP EMISSION TRENDS WITH MILEAGE

Engine Model Group Number	No. of Trucks in Group	Emission Trend With Mileage		
		Hydrocarbons	Carbon Monoxide	Corrected Nitric Oxide
9	3	Increased slightly from 10,000 to 30,000 miles, then decreased slightly to 50,000 miles	No trend	Decreased slightly from 10,000 to 30,000 miles, then increased slightly to 50,000 miles
10	17	No trend	No trend	No trend
11	1	Only one truck		
12	4	Increased slightly from 10,000 to 50,000 miles	Increased slightly from 10,000 to 50,000 miles	Decreased slightly from 10,000 to 50,000 miles
13	5	Increased slightly from 0 to 50,000 miles	Increased greatly from 0 to 50,000 miles	Decreased moderately from 0 to 50,000 miles
14	3	No trend	Increased greatly from 10,000 to 50,000 miles	Decreased slightly from 10,000 to 50,000 miles
15	4	Increased slightly from 0 to 30,000 miles	No trend	No trend
16	5	Decreased moderately from 5,000 to 30,000 miles, then moderate increase to 50,000	No trend	Increased slightly 5,000 to 50,000 miles

TABLE 7 (Cont'd). ENGINE MODEL GROUP EMISSION TRENDS WITH MILEAGE

Engine Model Group Number	No. of Trucks in Group	Emission Trend With Mileage		
		Hydrocarbons	Carbon Monoxide	Corrected Nitric Oxide
17	2	No trend	No trend	No trend
18	1	Only one truck		
19	13	No change 0 to 50,000 miles	No trend	No trend
20	8	No trend	No trend	Decreased moderately from 5,000 to 50,000 miles
21	23	No trend	No trend	No trend
22	7	No trend	No trend	No trend
23	5	Increased slightly from 5,000 to 50,000 miles	Increased slightly from 5,000 to 50,000 miles	Decreased slightly from 5,000 to 50,000 miles

trend, HC either had no change or increased slightly during the 50,000 miles. Carbon monoxide increased during the 50,000 miles for all engine groups that showed a trend. For the majority of the engine groups that showed a trend for NO, there was a decrease during the 50,000 miles.

To summarize the effects of mileage on emissions, it appears that there was no trend for the fleet as a whole. However, as mileage increases, CO levels were in general higher than the initial CO level, though there was no discernible relationship between mileage and CO level for the fleet as a whole. About 25 percent of the engine models did exhibit HC and CO emission level trends with mileage; for these engine models the only completely consistent trend was that CO increased with mileage. About 50 percent of the engine groups exhibited a trend for NO emission levels. Slightly more than half of these engine groups showed a decreasing NO level trend with mileage.

Thus the findings for the third objective of the project, to establish the performance of exhaust emission controls with mileage accumulation, are a good deal more nebulous than the findings for the first two objectives. As mentioned previously, when a truck was received for test "out of spec" for timing and idle speed, it was tested "as received" and then set to specifications and retested. These tests were compared to determine the effects of timing and idle speed on emissions. The results of that comparison are presented in the next section.

D. Effects of Timing and Idle Speed

As explained in Section III, the surveillance trucks were checked for timing and idle speed prior to each surveillance test. All vehicles tested in round 1 were intentionally run with timing and idle speed within manufacturers' specifications. The vehicles found to be out of timing and idle speed specifications during the other inspection rounds were tested as-received then adjusted to manufacturers' specifications for timing and idle speed and retested. The trucks were restored to the as-received condition prior to being returned to service.

Appendix Tables D-36 to D-41 show the as-received and "in spec" emission levels for those vehicles found to be out of specification for rounds 2 to 7, respectively. Of the 148 vehicles tested in round 2, 35 vehicles (about 20 percent) were out of specifications limits; for round 4, 24 vehicles of 145 (about 17 percent) were out of specification limits; for round 5, 18 vehicles of 140 (about 13 percent); for round 6, 5 vehicles of 137 (about 4 percent); and for round 7, 2 vehicles of 127 (about 2 percent) were out of specification limits.

The reasons for the drop in the number of out-of-spec vehicles in the last three rounds, and particularly the last two rounds, is not known. One reason is that several of the vehicles that were out-of-spec on previous rounds had reached the 50,000 mile testing limit and were not tested during the last two inspection rounds. Another reason is that the fuel shortage and increase in fuel prices in 1973 may have caused a general renewal of emphasis on maintainance and adjustments among some fleet owners.

Appendix Tables D-42 to D-47 show the percent change in emissions for each truck as the result of adjusting timing and idle speed for each of the inspection rounds. The most common reason for retest was excessively advanced timing. Timing was so advanced on 22 of the 35 vehicles requiring tests in round 2, 17 of 29 in round 3, 13 of 24 in round 4, 7 of 18 in round 5, 5 of 5 in round 6, and 2 of 2 in round 7. When the early timing was corrected, there was a substantial reduction in nitric oxide emission levels. A smaller, but fairly consistent reduction in hydrocarbons and carbon monoxide can also be seen. For those vehicles with late timing in almost every case emissions increased when adjusted to manufacturers' specifications.

E. Effects of Vehicle Variables

The plots of the individual truck emission levels in Appendix E and Figure 14 to 16 in the preceding section emphasize the wide range in both the emission levels and changes in levels from test to test. Obviously a number of variables affect the test results. Although beyond the scope of this project, an attempt was made to define some of the major variables. It should not be surprising, however, that there will be many individual trucks whose test results run counter to these general conclusions because of the effect of some parameter not considered.

The results from each inspection round were analyzed independently to obtain average, maximum, and minimum values for each contaminant and to determine what factors contributed to the emission level differences within a given round. The average, maximum and minimum values were presented in Table 6 in the previous section along with the standard deviation and coefficient of variation. The standard deviation and coefficient of variation (standard deviation divided by the average) are indicators of the data spread about the average.

For each inspection round, the frequency distribution and cumulative frequency distribution for each emission has been calculated. Plots of these distributions are contained in Appendix D, Figures D-1 to D-14. These plots also show the wide range of values obtained for each emission during an inspection round. The question arises as to whether this data spread is just the result of chance variations between trucks, or whether emission level is a function of some specific factor.

To determine what factors were significant in explaining the variation of emission levels within each inspection round, analysis of variance techniques were used. A linear regression analysis was performed on the first round data when 81 of the 152 trucks had completed testing. The analysis was done on HC, CO, and observed NO with engine make, number of cylinders, and gross weight each as the independent variable. The results indicated that for each emission there was a significant difference due to make. For HC and CO it was the only significant factor. For observed NO, however, the number of cylinders seemed to be more significant than make. The V-8 engines in general seemed to have lower NO emissions than 6 cylinder engines.

When the first test round was completed, examination of the data indicated that engine manufacturer and number of cylinders alone would not explain the differences in emission levels. It was, therefore, decided to analyze the data by engine model (manufacturer, displacement, and number of cylinders) using a one way analysis of variance. This was done for each of the emissions using 17 of the 23 engine model groups in the fleet. Please refer to Appendix Table A-3 for a description of each engine model group. The other six engine model groups had too few engines in the group for statistical analysis. The results of this analysis indicated a statistically significant difference at the .01 significance level. In other words, there was a 1 percent or less change that the emission level differences seen between engine models were due to pure chance.

To ascertain if other variables were significant factors in the emission level differences within the test round, a stepwise multiple linear regression analysis was performed. The following factors were considered:

Engine model (make and displacement) (23)
Transmission (2)
Service Category (6)
Mileage group (4)
Gross weight group (3)
Mileage at start of test

The numbers in parentheses indicate how many categories were in each factor. Please refer to Appendix Table A-4 for a definition of each of these factors (other than engine group) and the trucks included in each group. Variables were defined as follows:

1-22 for engines
23 for transmission
24-28 for service group
29-31 for mileage group
32-33 for gross weight group
34 mileage at start of test
35 HC, CO, or observed NO

Variables 1 to 33 were assigned values of 0 or 1. For example, engine code 1 was represented by assigning zeroes to variables 1 to 22. Engine 2 was represented by assigning a value of 1 to variable 1 and zeroes to variables 2 to 22. A similar coding scheme was used for the other factors.

In general, results from the stepwise multiple linear regression again indicated that engine model (make and displacement) was the most significant factor in explaining variations in HC, CO, and NO. This was the only significant factor for HC. For CO, there appeared to be a slight difference due to type of transmission. It should be noted, however, that of the 44 automatic transmissions, 22 were for the same engine model. Since only 7 of the 23 engine groups had any vehicles with automatic transmissions and these engine groups tended to be substantially all automatic transmissions or have only one automatic in the group, it is very hard to separate transmission from engine group. It would not be expected that transmission type would affect emissions since the nine-mode cycle is an engine exercise based solely on engine vacuum and rpm. It is felt, therefore, that the difference attributed to transmission is really due to engine group.

Initial mileage at the start of the project seemed to be a significant factor in explaining the differences in observed NO. The correlation coefficient between initial mileage and observed NO is 0.401. However, initial mileage correlates well with many of the engine model groups so that it is hard to separate initial mileage and engine group. Again, the best that can be said is that initial mileage may be significant in explaining observed NO emission differences within the first inspection round.

The same multiple linear regression analysis was used on the second round results. The results for round 2 were the same as those for round 1, that is, the most significant factor in explaining emission level differences was engine model. As in round 1, CO differences showed some correlation with type of transmission and odometer mileage seemed to be a factor in observed NO differences.

Since the multiple linear regression analysis showed only those factors that had been previously used to be of significance, it was decided to use the one-way analysis of variance technique on the subsequent rounds since it is easier to use and interpret and will yield just as useful results.

A one-way analysis of variance was performed on the third round data using the factors that had been shown to be significant in the previous two inspection rounds. The analysis was done on each emission (HC, CO, observed NO and corrected NO) by engine model group (manufacturer, displacement and number of cylinders) again using 17 of the 23 engine model groups in the fleet. For all emissions, engine group was a statistically significant variable at the .01 significance level. This agrees with the results from rounds 1 and 2 which also showed engine group as a statistically significant variable.

The analysis of variance was also run on both observed and corrected NO using number of engine cylinders as the independent variable. This analysis, too, indicated a statistical significance at the .01 significance level. Since number of cylinders is often an indication of displacement (6 cylinder engines normally having displacements below 300 cubic inches), it may be that displacement would correlate with NO levels. To check this, a regression analysis was performed on corrected NO with engine displacement as the independent variable. Because timing effects NO emissions (see Section VI-D), it was decided to use the data taken with the engine at the specification values for timing and idle speed. The regression analysis failed to show a reasonable correlation between displacement and corrected NO levels for any of six different curve forms.

CO had previously appeared to be somewhat influenced by type of transmission. Although it was felt that this was due to the close correlation between engine model group and transmission type, the relationship was also checked for round 3 inspections using the one-way analysis of variance. There was no correlation at the .01 significance level.

Similar analyses of variance were performed on the fourth through seventh round data. For all of these inspection rounds engine model was a statistically significant variable for CO and observed and corrected NO at the .01 significance level.

Engine model was not a statistically-significant variable for HC emission from the fifth through the seventh inspection round. The reason is probably associated with the increased dispersion of the data. Referring back to Table 6, it can be seen that the coefficient of variation increased from about 80 percent for round 4 to over 100 percent for rounds 5 through 7.

Using transmission type as the independent variable, an analysis of variance was run on CO levels for each of these inspection rounds. There was no correlation at the .01 significance level, except for the seventh round. Thus for three of the seven inspection rounds, CO level appeared to be influenced by type of transmission despite the fact that the test procedure is an engine exercise only. The scope of this project does not allow for further investigation into the reasons for this correlation, but it is presented as a point of possible future interest. The analysis of variance performed on NO emissions with number of engine cylinders as the independent variable showed that number of cylinders was significant at the .01 level for all inspection rounds.

Table 8 summarizes the results of the Analyses of Variance performed on inspection data. The table shows that engine model is the most significant variable in explaining emission level variations for all emissions. This fact lends added importance to the plots of average emissions for each engine group by inspection round presented in Figures 11 to 13. This graphical presentation provides a good overview for comparison of engine groups with each other and with the 1970 Federal standards. Appendix Tables D-8 through D-35 list this information in tabular form together with the minimum value, maximum value and standard deviation for each group.

F. Effects of Maintenance on Emissions

In order to determine if the quality of maintenance had an effect on emission level changes, the surveillance fleet was divided into three maintenance categories. These groups were designated as above average, average, and below average maintenance. Assignment was made by truck source so that all trucks from one fleet source are in the same maintenance category. Appendix Table A-5 lists the trucks, by unit number, assigned to each maintenance category.

For each truck, the change in emissions between its first test and last test was calculated. The average change and standard deviation of each emission type for each maintenance category was also calculated. These results are presented below.

	Average Emission Level Change in Maintenance Category		
	Above Average	Average	Below Average
HC ppm	74.	120.	205.
CO percent	0.36	0.79	1.42
Corrected NO ppm	161.	25.	-30.

An analysis of variance was also performed to determine if the difference between groups was statistically significant. The results showed that for CO, maintenance category was a statistically significant variable at the .01 significance level in emission level change between the first and last emission test. Maintenance category was not a significant variable at the .01 level for HC and corrected NO.

TABLE 8. RESULTS OF ANALYSIS OF VARIANCE

Inspection Round	Engine Group	Transmission Type	Number of Cylinders	Gross Vehicle Weight
		HC		
1	S(1)	NS(2)	NS	S
2	S	NS	NS	NS
3	S			
4	S			
5	NS			
6	NS			
7	NS			
		CO		
1	S	S	NS	NS
2	S	S	NS	NS
3	S	NS		
4	S	NS		
5	S	NS		
6	S	NS		
7	S	S		
		Corrected NO		
1	S	NS	S	NS
2	S	NS	S	NS
3	S		S	
4	S		S	
5	S		S	
6	S		S	
7	S		S	

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(1) S denotes that variable is significant at .01 significance level.

(2) NS denotes that variable is Not significant at .01 significance level.

G. Discussion of Analysis

Since few unqualified conclusions resulted from the data analysis, the reader is cautioned against using the results out of context or without due regard for how the conclusions were developed. However, within the context of the assumptions and restraints used in this section it is felt that the objectives of the project were fulfilled.

The effectiveness of the 1970 heavy-duty gasoline exhaust emission controls was demonstrated with the first round of chassis nine-mode FTP tests performed on the surveillance fleet. Even though these were chassis tests, the chassis-to-stationary engine dynamometer comparison performed as part of this study indicates that for the fleet as a whole, chassis tests will provide a general guide as to whether the exhaust emission controls were effective. Using the percentage of trucks below the Federal standard as an indicator of the effectiveness of the controls, Figure 17 can be used to make that judgment.

The second objective of the study, to define the performance of exhaust controls with time and mileage accumulation, has also been fulfilled. However, as can be expected with a complex problem, there is no simple answer. From the analysis presented in this section, it appears that time in service may be a more important factor in deterioration of HC and CO exhaust emissions than mileage. As time in service increased there was a definite trend to have fewer trucks within the Federal standards for HC and CO. There was no apparent exhaust emission trend for the fleet as a whole with mileage. Some individual engine groups do exhibit definite trends with mileage, though the trends for a given emission type are not all in the same direction. In fact, sufficient trucks had HC and CO emission that either decreased or did not change during the 50,000 miles of testing to conclude that it is erroneous to assume that exhaust emissions from trucks must increase with increasing mileage. Many factors influence the exhaust emission levels and changes in levels with time and mileage; a few have been examined in this report, but much more needs to be done to understand the behavior of exhaust emission levels from trucks in service.

It could be inferred that 1970 and 1971 gasoline HD trucks required little in the way of specific control and that in effect this project merely demonstrated the quality and durability of the basic engine. It might also be inferred that it remains to be seen what effect more stringent emission levels might play in the in-use aspects of HD gasoline truck emissions with time and mileage. These inferences bring up points that, though beyond the scope of this project, are nonetheless thought provoking.

VII. SUMMARY AND CONCLUSIONS

With the advent of exhaust emission standards for heavy-duty trucks in 1970, the need became apparent for information on the effectiveness of these controls on trucks in the field and on the emission behavior with time in service and mileage accumulation. The study covered in this report was undertaken to fulfill that need. To meet the objectives of the study, a fleet of 152 trucks in use by a variety of fleet owners in the San Antonio, Texas area was assembled for periodic testing of hydrocarbon, carbon monoxide, and nitric oxide exhaust emissions. The surveillance period was ultimately extended to 30 months or 50,000 miles, whichever came first, with up to seven periodic inspections performed on each truck.

The test used to obtain the exhaust emission levels was a chassis dynamometer version of the nine-mode Federal test procedure (FTP) used for gasoline powered truck certification. To ascertain the correlation between the chassis dynamometer and the stationary engine dynamometer versions of the nine-mode FTP, a group of 10 engines was run on both dynamometers using the nine-mode FTP to determine exhaust emissions. The results of the testing done under this project thus fall into two areas, the first being the results of the correlation tests and the second being the results of the surveillance tests themselves.

The conclusions from the correlation study of the 10 engines tested on both a stationary dynamometer and in a truck on a chassis dynamometer are summarized as follows:

1. There is no one value that will correlate the results of chassis and stationary engine dynamometer FTP tests. The agreement varied from engine to engine and for each emission. The difference between emission levels obtained from the two test methods normally ranged between ±25 percent. More than half of the test results agree within ±15 percent.

2. The generally-close agreement between chassis dynamometer and engine dynamometer test methods demonstrated by the correlation tests validated using the chassis dynamometer version of the Federal Test Procedure in surveillance testing and comparing the fleet averages to Federal standards. However, chassis test results from individual trucks should not be compared to Federal standards on a pass-or-fail basis. Although the stationary engine dynamometer test is the legal certification test method, the chassis dynamometer test is felt to be more realistic and indicative of how the engines perform in actual vehicle operation.

The two and one half years of surveillance testing met the major objectives of the study. The results are summarized below.

1. The 152 surveillance trucks were tested when new, or nearly new, and tuned to manufacturers' specifications for timing and idle speed using a chassis dynamometer version of the nine-mode FTP. Approximately 70 percent of the fleet, when new, had HC levels below the 1970 Federal standard of 275 ppm hexane. Approximately 50 percent of the fleet, when new, had CO levels below the Federal standard of 1.5 percent at that time.

2. The majority of the surveillance fleet had hydrocarbon emission levels less than the 1970 Federal standards of 275 ppm hexane for all inspections during the two and one half years of the program. Nitric oxide emission levels for the majority of the fleet were less than the proposed (but not adopted) 1973 limit of 2000 ppm for all inspections. The majority of the fleet had CO levels greater than the 1970 Federal standards of 1.5 percent for all inspections.

3. The fleet average emission level for HC and CO emissions increased during the surveillance period. The fleet average NO emission level remained essentially unchanged.

4. The percentage of trucks within a test round having HC levels below 275 ppm tended to decrease with increasing time. The percentage of trucks with CO levels less than 1.5 percent also tended to decrease with increasing time. The percentage of trucks with NO levels below 2000 ppm tended to increase with increasing time.

5. Approximately 25 percent of the individual engine groups showed an increase in CO levels with mileage, and about 50 percent exhibited a decrease in NO levels with mileage.

6. Engines with spark timing more advanced than the manufacturers' specifications showed higher levels of NO than was the case where they were adjusted to manufacturers' specifications.

7. The surveillance inspections showed a large range of exhaust emission levels for HC, CO, and NO within each inspection round. Engine model was the most significant factor in explaining this emission level range within any test round.

8. The number of cylinders in an engine correlated with NO level differences within each inspection round. In general, 6 cylinder engines had higher NO levels than 8 cylinder engines.

9. The quality of maintenance was a significant factor in explaining increases in CO levels during the surveillance period.

In conclusion, this study provided the necessary information to evaluate the effectiveness of the 1970 exhaust emission controls. The emission level changes with time and mileage accumulation appear to indicate that time in service is more important than mileage in defining deterioration. Some HC and CO deterioration is evident in the fleet with time. This does not mean, however, that all trucks have higher HC and CO levels at the end of the test than at the beginning. It is quite possible for a truck to have had the same or lower emissions at the end of the surveillance project than at the beginning. Since there were few emission control devices on the trucks, what deterioration that did occur is felt to be due to general engine deterioration. Whether the trends seen in this report are valid for trucks meeting the 1974 standards which require a more stringent level of control is not known. It is therefore recommended that a surveillance study of 1974 trucks be undertaken to ascertain if the emission trends seen in this study are valid for trucks meeting more stringent standards.

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APPENDIX A

DESCRIPTIONS OF VEHICLES TESTED

TABLE A-1. DESCRIPTION OF STATIONARY ENGINE-TO-CHASSIS DYNAMOMETER CORRELATION TEST TRUCKS

No.	Year	Make	GVW	CID	Cyl.	Body	Date	Mileage	Source
1	1970	Ford	10,000	300	6	Stake	8-71	8,200	Hertz
2	1970	Ford	7,500	240	6	Pickup	8-71	22,500	Hertz
3	1969	Dodge	23,000	318	V8	Stake	9-71	33,500	O. R. Mitchell
4	1970	White	30,000	400	6	Tractor	11-71	25,300	ABC
5	1971	Ford	23,000	330	V8	Van	11-71	800	Hertz
6	1970	Chev	18,000	350	V8	Van	11-71	11,300	E Z Haul
7	1970	IHC	16,000	345	V8	Van	12-71	9,800	ABC
8	1971	IHC	32,000	478	V8	Tractor	1-72	20,200	ABC
9	1970	Chev	14,000	292	6	Van	1-72	5,000	City Parks & Rec. Dept.
10	1971	IHC	26,000	392	V8	Maint.	2-72	83	CPSB

TABLE A-2. DESCRIPTION OF SURVEILLANCE FLEET

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs.	Vehicle Type	Initial Mileage
1	10-22-70	P041001	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	8
2	10-22-70	P040999	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	19
3	10-23-70	P040997	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	21
4	10-23-70	P041000	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	38
5	10-23-70	P041002	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	22
6	11-18-70	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9245
7	11-19-70	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9109
8	11-20-70	351	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9178
9	11-23-70	350	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9010
10	11-24-70	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9552
11	11-25-70	24340	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	163
12	11-27-70	24341K	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	96
13	11-27-70	24343	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	2730
14	11-27-70	24342	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	1259
15	11-30-70	56	N. S. S. D.	1970	IHC	345	V8	5	25,500	School Bus	4196
16	12-1-70	53	N. S. S. D	1970	IHC	345	V8	5	25,500	School Bus	4037
17	12-2-70	55	N. S. S. D.	1970	IHC	345	V8	5	25,500	School Bus	3620
18	12-3-70	6	N. S. S. D.	1970	IHC	345	V8	5	22,000	School Bus	4197
19	12-4-70	54	N. S. S. D.	1970	IHC	345	V8	5	22,000	School Bus	3961
20	12-3-70	72361	Hertz	1970	Ford	300	6	3 auto	10,000	Stake	7361
21	12-4-70	72218	Hertz	1970	Ford	240	6	3 auto	7,500	Pickup	9108
22	12-4-70	5131	C. P. S. B.	1971	IHC	392	V8	3 auto	25,500	Line	44
23	12-4-70	5132	C. P. S. B.	1970	IHC	392	V8	3 auto	25,500	Line	43
24	12-7-70	5136	C. P. S. B.	1971	IHC	392	V8	3 auto	25,500	Line	37
25	12-7-70	5141	C. P. S. B.	1971	IHC	392	V8	3 auto	25,500	Line	29
26	12-4-70	4952	C. P. S. B.	1971	IHC	304	V8	4	14,000	Van	34
27	12-7-70	6615	C. P. S. B.	1970	Ford	300	6	4	10,000	Service	365
28	12-7-70	6616	C. P. S. P.	1970	Ford	300	6	4	10,000	Service	415
29	12-8-70	4824	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	2103
30	12-8-70	4726	C. P. S. B.	1970	Chevrolet	292	6	4	9,000	Service	4356
31	12-10-70	4728	C. P. S. B.	1970	Chevrolet	250	6	4	7,500	Service	3000
32	12-10-70	4729	C. P. S. B.	1970	Chevrolet	250	6	4	7,500	Service	1274
33	12-10-70	671	Brown Exp.	1971	Ford	300	6	5	24,000	Freight Van	20
34	12-10-70	672	Brown Exp.	1971	Ford	300	6	5	24,000	Freight Van	27
35	12-10-70	673	Brown Exp.	1971	Ford	300	6	5	24,000	Freight Van	12
36	12-10-70	4727	C. P. S. B.	1970	Chevrolet	250	6	4	7,500	Service	2228
37	12-10-70	4730	C. P. S. B.	1970	Chevrolet	250	6	4	7,500	Service	841
38	12-11-70	4951	C. P. S. B.	1970	IHC	304	V8	4	14,000	Service	1549
39	12-11-70	6810	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	1677
40	12-14-70	6811	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	1227
41	12-14-70	6855	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	343
42	12-15-70	6617	C. P. S. B.	1970	Ford	300	6	4	10,000	Wrecker	414
43	12-15-70	6856	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	2770
44	12-16-70	6671	C. P. S. B.	1970	Ford	300	6	4	10,000	Stake	1142
45	12-16-70	6857	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	3357
46	12-17-70	4950	C. P. S. B.	1970	IHC	304	V8	4	19,700	Bucket Truck	561
47	12-28-70	312	C. W. B.	1970	IHC	304	V8	4	19,700	Service	6816
48	12-28-70	314	C. W. B.	1970	IHC	304	V8	4	19,700	Service	3521
49	12-29-70	301	C. W. B.	1970	IHC	304	V8	4	10,000	Crew Truck	3099
50	12-29-70	302	C. W. B.	1970	IHC	304	V8	4	10,000	Crew Truck	4264

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*Hi-Lo means two-speed rear axle.

TABLE A-2 (Cont'd). DESCRIPTION OF SURVEILLANCE FLEET

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs	Vehicle Type	Initial Mileage
51	12-30-70	93	Pearl	1970	IHC	304	V8	3	7,500	Delivery	11,034
52	12-31-70	105	Pearl	1970	GMC	292	6	3	7,500	Delivery	15,944
53	12-31-70	106	Pearl	1970	Dodge	318	V8	3	7,500	Delivery	8,504
54	12-31-70	122	Pearl	1970	Ford	300	6	3	7,500	Delivery	18,143
55	1-2-71	311	C. W. B.	1970	IHC	304	V8	4	19,700	Service	3,729
56	1-2-71	313	C. W. B.	1970	IHC	304	V8	4	19,700	Service	4,938
57	1-2-71	315	C. W. B.	1970	IHC	304	V8	4	19,700	Service	2,812
58	1-2-71	316	C. W. B.	1970	IHC	304	V8	4	19,700	Service	1,522
59	1-2-71	317	C. W. B.	1970	IHC	304	V8	4	19,700	Service	3,320
60	1-3-71	253	C. W. B.	1970	Chevrolet	307	V8	4	7,500	Service	2,056
61	1-3-71	254	C. W. B.	1970	Chevrolet	307	V8	4	7,500	Service	5,011
62	1-3-71	391	C. W. B.	1970	Chevrolet	366	V8	5	32,000	Crane	687
63	1-3-71	392	C. W. B.	1970	Chevrolet	366	V8	5	32,000	Crane	990
64	1-6-71	582	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	14,520
65	1-7-71	581	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	10,656
66	1-9-71	251	C. W. B.	1970	Dodge	318	V8	3 auto	7,500	Meter	6,025
67	1-9-71	252	C. W. B.	1970	Dodge	318	V8	3 auto	7,500	Service	8,961
68	1-9-71	360	C. W. B.	1970	Ford	361	V8	5	25,500	Dump	8,094
69	1-12-71	5133	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	32
70	1-12-71	5140	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	30
71	1-12-71	5097	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	456
72	1-12-71	5106	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	464
73	1-13-71	5130	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	45
74	1-13-71	5135	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	287
75	1-16-71	M-78	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	5,963
76	1-16-71	M-80	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	1,791
77	1-16-71	M-98	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	2,019
78	1-16-71	SH-680	State Hosp	1970	Ford	302	V8	3 auto	6,800	Van	1,442
79	1-16-71	SH-699	State Hosp	1970	GMC	401	V6	5	27,080	Bus	838
80	1-18-71	1029	Lone Star	1970	Chevrolet	307	V8	4	6,680	Delivery	26,622
81	1-20-71	134	Herder	1970	Ford	300	6	5	21,000	Freight	16,201
82	1-21-71	135	Herder	1970	Ford	300	6	5	21,000	Freight	11,190
83	1-21-71	239	Herder	1970	Ford	361	V8	5	22,000	Freight	10,511
84	1-21-71	240	Herder	1970	Ford	361	V8	5	22,000	Freight	13,920
85	1-21-71	250	C. W. B.	1970	Chevrolet	307	V8	2 auto	7,500	Service	18,225
86	1-21-71	L-41	State Hosp	1970	Dodge	225	6	3 auto	10,000	Laundry	2,568
87	1-21-71	M-77	State Hosp	1970	Dodge	225	6	3 auto	10,000	Grounds	1,985
88	1-21-71	M-87	State Hosp	1970	Dodge	225	6	3 auto	7,500	Service	4,875
89	1-23-71	M-90	State Hosp	1970	Dodge	225	6	3 auto	10,000	Maintenance	3,274
90	1-23-71	M-95	State Hosp	1970	Dodge	225	6	3 auto	10,000	Grounds	201
91	1-26-71	2179	City P&R	1970	IHC	345	V8	4	19,000	Water Truck	219
92	1-27-71	2120	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	2,948
93	1-27-71	27	B. M. W.	1970	Ford	360	V8	4	7,500	Repair	7,553
94	1-28-71	2073	City P&R	1970	Chevrolet	292	6	3 auto	14,000	Maintenance	1,770
95	1-28-71	2121	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	2,262
96	1-29-71	4T1	B. C. R. D.	1970	Ford	240	6	3	7,500	Maintenance	13,174
97	1-29-71	4T16	B. C. R. D.	1970	Ford	240	6	3	7,500	Welder	9,762
98	1-30-71	1T22	B. C. R. D.	1970	Ford	330	V8	5	21,000	Water Truck	15,424
99	1-30-71	2T9	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water Truck	12,301
100	1-30-71	2T12	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water Truck	9,339

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*Hi-Lo means two-speed rear axle

TABLE A-2 (Cont'd). DESCRIPTION OF SURVEILLANCE FLEET

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs.	Vehicle Type	Initial Mileage
101	1-30-71	4T23	B.C.R.D.	1970	Ford	330	V8	5	21,000	Water Truck	11,705
102	2-3-71	7	B.M.W.	1970	Ford	360	V8	4	6,100	Maintenance	12,879
103	2-3-71	34	Southern	1970	GMC	427	V8	5*	32,500	Moving	2,123
104	2-4-71	2085	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	10,178
105	2-4-71	2122	City P&R	1970	IHC	392	V8	5	25,500	Maintenance	1,911
106	2-5-71	2119	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	2,166
107	2-5-71	2123	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	2,829
108	2-8-71	2168	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	2,612
109	2-8-71	2169	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	641
110	2-9-71	2081	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	5,057
111	2-9-71	2082	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	6,748
112	2-10-71	2170	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	14,584
113	2-11-71	51346	C P S B	1971	IHC	392	V8	6 auto	24,000	Construction	51
114	2-12-71	51375	C P S B	1971	IHC	392	V8	6 auto	25,500	Construction	52
115	2-12-71	51383	C P S B	1971	IHC	392	V8	6 auto	25,500	Construction	37
116	2-16-71	4364	Elmore	1970	GMC	350	V8	4	14,000	Moving	15,682
117	2-18-71	16	Elmore	1970	GMC	350	V8	4	10,000	Moving	15,764
118	2-18-71	043247	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	14
119	2-19-71	043144	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	15
120	2-19-71	043327	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	11
121	2-20-71	98	Face	1970	GMC	292	6	4	10,000	Delivery	5,091
122	2-20-71	101	Face	1970	GMC	292	6	4	10,000	Delivery	6,001
123	2-20-71	102	Face	1970	GMC	292	6	4	10,000	Delivery	6,488
124	2-21-71	105	Face	1970	GMC	292	6	4	10,000	Delivery	2,938
125	3-9-71	043221	P.O.D.	1970	Dodge	318	V8	3 auto	7,000	Delivery	333
126	3-11-71	042519	P.O.D.	1970	Dodge	318	V8	3 auto	7,000	Delivery	1,692
127	4-24-71	1085	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	737
128	4-6-71	1086	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	52
129	4-7-71	1088	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	227
130	4-12-71	1353	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	322
131	4-22-71	1347	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	340
132	4-23-71	1355	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	321
133	4-23-71	1340	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	320
134	4-27-71	[illegible]	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	312
135	4-27-71	1345	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	14
136	4-27-71	[illegible]	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	306
137	4-28-71	[illegible]	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	305
138	4-28-71	[illegible]	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	299
139	4-28-71	[illegible]	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	310
140	4-29-71	[illegible]	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	314
141	[illegible]	1087	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	1,053
142	5-18-71	496	ABC	1971	IHC	478	V8	5	32,000	Rental	7,725
143	5-18-71	497	ABC	1971	IHC	478	V8	5	32,000	Rental	1,432
144	5-19-71	503	ABC	1971	IHC	478	V8	5	32,000	Rental	3,273
145	5-21-71	3	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	23
146	5-24-71	1	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	759
147	5-24-71	5	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	172
148	5-24-71	2	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	119
149	6-11-71	7	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	1,441
150	6-11-71	4	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	1,504
151	6-16-71	276-15T	Southern	1971	Chevrolet	427	V8	5	32,500	Moving Co.	3,554
152	6-18-71	6	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	2,121

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*Hi-Lo means two-speed rear axle.

TABLE A-3. GASOLINE SURVEILLANCE FLEET MAKE AND CID CATEGORIES (ENGINE MODEL GROUPINGS)

Category	No. of Vehicles	Make	CID	Cyl.	Source	GVW	Unit Numbers
1	4	1970 Chevrolet	250	6	C. P. S. B.	7,500	31, 32, 36, 37
2	2	1970 Chevrolet	292	6	C. P. S. B.	9,000	30
				6	City P & R	14,000	94
3	11	1970 Chevrolet	307	V8	C. W. B.	7,500	60, 61, 85
				V8	Lone Star	6,600	80
				V8	City P & R	7,500	104, 107, 110, 111
				V8	City P & R	10,000	108, 109, 112
4	7	1971 Chevrolet	350	V8	JFC	24,000	145, 146, 147, 148, 149, 150, 152
5	2	1970 Chevrolet	366	V8	C. W. B.	32,000	62, 63
6	2	1970 GMC	427	V8	Southern	32,500	103
		1971 Chevrolet	427	V8	Southern	32,500	151
7	8	1970 Dodge	225	6	State Hospital	7,500	75, 76, 77, 88
				6	State Hospital	10,000	86, 87, 89, 90
8	15	1970 Dodge	318	V8	P. O. D.	7,000	118, 119, 120, 125, 126
				V8	Pearl	7,500	53
				V8	C. W. B.	7,500	66, 67
				V8	P. O. D.	10,000	1, 2, 3, 4, 5,
				V8	Red Arrow	24,000	64, 65
9	3	1970 Ford	240	6	Hertz	7,500	21
				6	B. C. R. D.	7,500	96, 97

TABLE A-3 (Cont'd). GASOLINE SURVEILLANCE FLEET MAKE AND CID CATEGORIES (ENGINE MODEL GROUPINGS)

Category	No. of Vehicles	Make	CID	Cyl.	Source	GVW	Unit Numbers
10	17	1970 Ford	300	6	Pearl	7,500	54
				6	Hertz	10,000	20
				6	C.P.S.B.	10,000	27, 28, 42, 44
				6	C.P.S.B.	16,000	29, 39, 40, 41, 43, 45
				6	Herder	21,000	81, 82
		1971 Ford	300	6	Brown Exp.	24,000	33, 34, 35
11	1	1970 Ford	302	V8	State Hospital	6,800	78
12	4	1970 Ford	330	V8	B.C.R.D.	21,000	98, 99, 100, 101
13	5	1970 Ford	360	V8	B.M.W.	6,100	102
				V8	B.M.W.	7,500	93
				V8	City P & R	8,300	92, 95, 106
14	3	1970 Ford	361	V8	Herder	22,000	83, 84
				V8	C.W.B.	25,500	68
15	4	1971 Ford	391	V8	Lone Star	27,500	127, 128, 129, 141
16	5	1970 CMC	292	6	Pearl	7,500	52
				6	Facs	10,000	121, 122, 123, 124
17	2	1970 GMC	350	V8	Elmore	10,000	117
				V8	Elmore	14,000	116
18	1	1970 GMC	401	V6	State Hospital	27,000	79

TABLE A-3 (Cont'd). GASOLINE SURVEILLANCE FLEET MAKE AND CID CATEGORIES (ENGINE MODEL GROUPINGS)

Category	No. of Vehicles	Make	CID	Cyl.	Source	GVW	Unit Numbers
19	13	1970 IHC	304	V8	Pearl	7,500	51
				V8	C. W. B.	10,000	49, 50
				V8	C. P. S. B.	14,000	38
				V8	C. P. S. B.	19,700	46
				V8	C. W. B.	19,700	47, 48, 55, 56, 57, 58, 59
		1971 IHC	304	V8	C. P. S. B.	14,000	26
20	8	1970 IHC	345	V8	City P & R	19,000	91
				V8	N. S. S. D.	22,000	18, 19
				V8	N. S. S. D.	25,500	15, 16, 17
		1971 IHC	345	V8	C. P. S. B.	25,000	71, 72
21	23	1970 IHC	392	V8	C. P. S. B.	25,500	23, 69, 70, 73, 74
				V8	City P & R	25,500	105
		1971 IHC	392	V8	C. P. S. B.	24,000	113
				V8	C. P. S. B.	25,500	22, 24, 25, 114, 115
				V8	S. A. P. W.	34,000	130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140
22	7	1970 IHC	478	V8	Ryder	32,000	11, 12, 13, 14
		1971 IHC	478	V8	ABC	32,000	142, 143, 144
23	5	1970 White	400	6	ABC	30,000	6, 7, 8, 9, 10
	152 Total						

TABLE A-4. DEFINITIONS AND UNIT NUMBERS FOR VARIABLES USED IN SURVEILLANCE FLEET STATISTICAL ANALYSIS

A. Automatic Transmission versus Conventional

44 Automatic Units: Nos. 1, 2, 3, 4, 5, 20, 21, 22, 23, 24, 25, 66, 67, 69, 70, 73, 74, 78, 85, 86, 87, 88, 89, 90, 94, 113, 114, 115, 118, 119, 120, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, and 140.
Remaining units are conventional shift transmissions.

B. Type of Application

26 Stop and Go Units: Nos. 1, 2, 3, 4, 5, 15, 16, 17, 18, 19, 118, 119, 120, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140.

22 Line-Haul Tractors: Nos. 6, 7, 8, 9, 10, 11, 12, 13, 14, 79, 103, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152

26 Freight and Related Delivery: Nos. 20, 21, 33, 34, 35, 51, 52, 53, 54, 64, 65, 80, 81, 82, 83, 84, 116, 117, 121, 122, 123, 124, 127, 128, 129, 141

25 Large Service Trucks (24,000-lb GVW and Above): Nos. 22, 23, 24, 25, 42, 44, 49, 50, 62, 63, 68, 69, 70, 71, 72, 73 74, 98, 99, 100, 101, 105, 113, 114, 115.

20 Medium Service Trucks (Greater than 10,000 but less than 24,000 GVW): Nos. 26, 27, 28, 29, 38, 39, 40, 41, 43, 45, 46, 47, 48, 55, 56, 57, 58, 59, 91, 94.

33 Small Service Trucks (10,000-lb and less): Nos. 30, 31, 32, 36, 37, 60, 61, 66, 67, 75, 76, 77, 78, 85, 86, 87, 88, 89, 90, 92, 93, 95, 96, 97, 102, 104, 106, 107, 108, 109, 110, 111, 112.

TABLE A-4 (Cont'd). DEFINITIONS AND UNIT NUMBERS FOR VARIABLES USED IN SURVEILLANCE FLEET STATISTICAL ANALYSIS

C. Gross Vehicle Weight

62 Large Trucks (24,000-lb and above): Nos. 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 22, 23, 24, 25, 33, 34, 35, 62, 63, 64, 65, 68, 69, 70, 71, 72, 73, 74, 79, 103, 105, 113, 114, 115, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152.

58 Medium Trucks (Greater than 10,000 but less than 24,000-lb): Nos. 1, 2, 3, 4, 5, 18, 19, 20, 26, 27, 28, 29, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 55, 56, 57, 58, 59, 81, 82, 83, 84, 86, 87, 89, 90, 91, 94, 98, 99, 100, 101, 108, 109, 112, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126.

32 Small Trucks (Less than 10,000 but greater than 6,000-lb): Nos, 21, 30, 31, 32, 36, 37, 51, 52, 53, 54, 60, 61, 66, 67, 75, 76, 77, 78, 80, 85, 88, 92, 93, 95, 96, 97, 102, 104, 106, 107, 110, 111.

D. Vehicle Mileage at Start of Test (Zero Month)

50 Units with 0-499 miles: Nos. 1, 2, 3, 4, 5, 11, 12, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 41, 42, 69, 70, 71, 72, 73, 74, 90, 91, 113, 114, 115, 118, 119, 120, 125, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 145, 147, 148.

47 Units with 500-3499 miles: Nos. 13, 14, 29, 31, 32, 36, 37, 38, 39, 40, 43, 44, 45, 46, 49, 57, 58, 59, 60, 62, 63, 76, 77, 78, 79, 86, 87, 89, 92, 94, 95, 103, 105, 106, 107, 108, 109, 124, 126, 127, 141, 143, 144, 146, 149, 150, 152.

35 Units with 3500-9,999 miles: Nos. 6, 7, 8, , 10, 15, 16, 17, 18, 19, 20, 21, 30, 47, 48, 50, 53, 55, 56, 61, 66, 67, 68, 75, 88, 93, 97, 100, 110, 111, 121, 122, 123, 142, 151.

20 Units with 10,000 miles and above: Nos. 51, 52, 54, 64, 65, 80, 81, 82, 83, 84, 85, 96, 98, 99, 101, 102, 104, 112, 116, 117.

TABLE A-5. MAINTENANCE CATEGORIES

Category	Number of Trucks in Category	Unit Numbers
Above Average Maintenance	58	1-10, 15-19, 22-32, 36-46, 51-54, 69-74, 113-115, 118-120, 125, 126, 142-144
Average Maintenance	51	11-14, 20, 21, 47-49, 50, 55-63, 66-68, 75-79, 86-95, 102, 104-112, 121-124
Below Average Maintenance	39	64, 65, 80-84, 96-101, 103, 116, 117, 127-141, 145-152

APPENDIX B

CORRELATION GROUP
DATA SUMMARY FOR INDIVIDUAL TRUCKS

9 MODE FEDERAL CYCLE
TABLE B-1. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 1

Engine: Ford 300 CID, 6 Cyl. Vehicle: 1970 Ford, 10,000-lb GVW Stake

			HC	CO	NO, ppm	
Date	Test	Dynamometer	ppm n Hex	%	Obs	Corr
8-5-71	1	Stationary	156	1.41	2078	2319
8-6-71	1	"	165	1.36	2067	2276
8-6-71	2	"	161	1.43	2084	2294
	Average		161	1.40	2076	2296
	Spread: $\left(\frac{\text{Max-Min}}{\text{Avg}} \right) \times 100$		5.6%	5.0%	0.8%	1.9%
8-11-71	1	Chassis	182	1.04	1716	1704
8-11-71	2	"	179	1.07	1807	1794
8-11-71	3	"	184	1.09	1719	1707
	Average		182	1.07	1747	1735
	Spread: $\left(\frac{\text{Max-Min}}{\text{Avg}} \right) \times 100$		2.8%	4.7%	5.2%	5.2%
	Average Stationary		161	1.40	2076	2296
	Average Chassis		182	1.07	1747	1735
	Difference*		21	-0.33	-329	-561
	Percent Difference**		13	-23.6	-15.9	-24.5

*(Chassis - Stationary)
**(Chassis - Stationary) ÷ Stationary X 100

TABLE B-2. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 2

Engine: Ford 240 CID, 6 cyl. Vehicle: 1970 Ford, 7,500-lb GVW Pickup

Date	Test	Dynamometer	HC	CO	NO, ppm	
			ppm n. Hex.	%	Obs.	Corr.
8-24-71	2	Chassis	182	.626	1966	1952
8-25-71	3	"	175	.707	1797	1763
8-26-71	1	"	174	.662	1979	1987
8-26-71	2	"	177	.631	1958	1966
Average			177	.657	1925	1917
Spread: $\left(\frac{\text{Max-Min}}{\text{Avg}}\right)$ X 100			4.5%	12.3%	9.4%	11.7%
9-2-71	1	Stationary	157	.560	1227	1384
9-2-71	2	"	152	.464	1394	1572
9-2-71	3	"	140	.423	1373	1549
Average			150	.482	1331	1502
Spread: $\left(\frac{\text{Max-Min}}{\text{Avg}}\right)$ X 100			11.3%	28.4%	12.5%	12.5%
9-21-71	1	Stationary	139	.456	1653	1685
9-21-71	2	"	139	.454	1648	1694
9-21-71	3	"	143	.510	1669	1715
Average			140	.473	1657	1698
Spread: $\left(\frac{\text{Max-Min}}{\text{Avg}}\right)$ X 100			2.9%	11.8%	1.3%	1.8%
9-27-71	2	Chassis	169	.629	1464	1480
9-27-71	3	"	165	.663	1366	1381
9-27-71	4	"	168	.635	1394	1409
Average			167	.642	1408	1423
Spread: $\left(\frac{\text{Max-Min}}{\text{Avg}}\right)$ X 100			2.3%	5.3%	7.0%	7.0%
		Average Stationary	143	.478	1494	1600
		Average Chassis	172	.650	1703	1705
		Difference*	29	.172	209	105
		Percent Difference**	20.3	36.0	14.0	6.6

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*(Chassis - Stationary

**(Chassis - Stationary) ÷ Stationary X 100

BLE B-3. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 3

Engine: Dodge 318 CID V8

Vehicle: 1969 Dodge, 23,000 lb GVW
Stake

Date	Test	Dynamometer	HC ppm n. Hex.	CO %	NO, ppm Obs.	NO, ppm Corr.
10-12-71	1	Chassis	310	3.319	1624	1556
10-12-71	2	"	279	3.243	1625	1557
10-12-71	4	"	290	3.335	1696	1625
	Average		293	3.306	1648	1579
	Spread	$(\frac{\text{Max-Min}}{\text{Avg}})$ X 100	10.6%	3.4%	4.4%	4.4%
10-19-71	2	Stationary	308	4.741	1338	1513
10-20-71	1	"	294	4.437	1525	1429
10-20-71	2	"	296	4.353	1728	1662
10-20-71	3	"	288	4.183	1716	1665
	Average		297	4.429	1577	1567
	Spread	$(\frac{\text{Max-Min}}{\text{Avg}})$ X 100	6.7%	12.6%	24.7%	15.1%

	HC ppm n. Hex.	CO %	NO, ppm Obs.	NO, ppm Corr.
Average Stationary	297	4.429	1577	1567
Average Chassis	293	3.306	1648	1579
Difference*	-4	-1.123	71	12
Percent Difference**	-1.3	-25.3	4.5	0.8

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*(Chassis - Stationary)

**(Chassis - Stationary) ÷ Stationary X 100

TABLE B-4. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 4

Engine: White 400 CID, 6 Cyl.

Vehicle: 1970 White, 30,000-lb GVW Tractor

Date	Test	Dynamometer	HC ppm n. Hex.	CO %	NO, ppm Obs.	NO, ppm Corr.
11-23-71	1	Stationary	157	1.74	1614	1456
11-23-71	2	Stationary	163	1.73	1647	1486
11-23-71	3	Stationary	169	1.66	1583	1450
11-23-71	4	Stationary	161	1.66	1651	1506
	Average		163	1.70	1624	1475
	Spread $\left(\frac{\text{Max-Min}}{\text{Avg}}\right) \times 100$		7.4%	4.7%	4.2%	3.8%
11-8-71	2	Chassis	206	2.38	1792	1641
11-9-71	1	Chassis	204	2.39	1577	1511
11-9-71	2	Chassis	211	2.48	1747	1680
	Average		207	2.41	1705	1611
	Spread $\left(\frac{\text{Max-Min}}{\text{Avg}}\right) \times 100$		3.4%	4.0%	12.6%	10.4%
	Average Stationary		163	1.70	1624	1475
	Average Chassis		207	2.41	1705	1611
	Difference*		+44	+0.71	+81	+136
	Percent Difference**		+27.0	+41.8	+5.0	+9.2

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*(Chassis - Stationary)

**(Chassis - Stationary) ÷ Stationary X 100

TABLE B-5. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 5

Engine: Ford 330 CID V8

Vehicle: 1971 Ford 23,000 lb. GVW Van

Date	Test	Dynamometer	HC ppm n. Hex.	CO %	NO, ppm Obs.	NO, ppm Corr.
12/6/71	1	Stationary	188	1.121	1306	1117
12/6/71	2	Stationary	191	1.293	1273	1088
12/6/71	3	Stationary	186	1.114	1393	1185
	Average		188	1.176	1324	1130
	Spread $\left(\frac{\text{Max-Min}}{\text{Avg}}\right)$ X 100		2.6%	14.6%	9.1%	8.6%
11/11/71	1	Chassis	225	1.061	1414	1290
11/11/71	2	Chassis	213	1.006	1441	1326
11/11/71	3	Chassis	216	1.045	1454	1338
	Average		218	1.037	1436	1318
	Spread $\left(\frac{\text{Max-Min}}{\text{Avg}}\right)$ X 100		5.5%	5.3%	2.7%	3.6%
	Average Stationary		188	1.176	1324	1130
	Average Chassis		216	1.037	1436	1318
	Difference*		+28	-.139	+112	188
	Percent Difference**		+15.0	-11.8	+8.4	16.6

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* (Chassis-Stationary)

** (Chassis-Stationary) ÷ Stationary X 100

TABLE B-6. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 6

Engine: Chevrolet 350 CID V8 **Vehicle:** 1970 Chevrolet 18,000 lb. GVW Van

Date	Test	Dynamometer	ppm n. Hex	CO %	NO, ppm Obs.	NO, ppm Corr.
12/10/71	1	Stationary	125	1.782	926	806
12/10/71	2	Stationary	131	1.788	912	847
12/10/71	3	Stationary	130	1.753	940	781
	Average		129	1.774	926	811
	Spread $\left(\frac{\text{Max-Min}}{\text{Avg}}\right)$ X 100		4.7%	2.0%	3.0%	8.1%
11/23/71	1	Chassis	130	2.020	872	759
11/24/71	1	Chassis	129	1.940	880	770
11/24/71	2	Chassis	130	2.009	856	732
	Average		130	1.990	869	754
	Spread $\left(\frac{\text{Max-Min}}{\text{Avg}}\right)$ X 100		0.8%	4.0%	2.8%	5.0%
	Average Stationary		129	1.774	926	811
	Average Chassis		130	1.990	869	754
	Difference*		1	.216	-57	-57
	Percent Difference**		.8%	12.2%	-6.1%	-7.0%

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* (Chassis-Stationary)

** (Chassis-Stationary) ÷ Stationary X 100

TABLE B-7. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 7

Engine: IHC 345 CID

Vehicle: 1970, 16,000-lb GVW Van

Date	Test	Dynamometer	HC ppm n. Hex.	CO %	NO, ppm Obs.	NO, ppm Corr.
1/4/72	1	Stationary	273	1.714	2900	2276
1/4/72	2	Stationary	253	1.545	2849	2295
1/4/72	3	Stationary	244	1.585	2819	2165
	Average		257	1.614	2856	2245
	Spread ($\frac{\text{Max-Min}}{\text{Avg}}$) X 100		11.3%	10.5%	2.8%	5.8%
12/16/71	1	Chassis	209	2.075	2359	2140
12/16/71	2	Chassis	205	2.016	2369	2229
12/16/71	3	Chassis	209	2.134	2296	2252
	Average		208	2.075	2341	2207
	Spread ($\frac{\text{Max-Min}}{\text{Avg}}$) X 100		1.9%	3.5%	3.1%	5.1%
	Average Stationary		257	1.614	2856	2245
	Average Chassis		208	2.075	2341	2207
	Difference*		-49	0.461	-515	-38
	Percent Difference**		-19.1	28.6	-21.9	-1.7

---

*(Chassis-Stationary)

**(Chassis-Stationary) ÷ Stationary X 100

TABLE B-8. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 8

Engine: IHC 478 CID, V-8

Vehicle: 1971 IHC 32,000-lb GVW Tractor

Date	Test	Dynamometer	HC ppm n. Hex.	CO %	NO, ppm Obs.	NO, ppm Corr.
1/19/72	1	Stationary	218	1.576	1629	1691
1/19/72	2	Stationary	209	1.571	1593	1679
	Average		214	1.574	1611	1685
	Spread $(\frac{\text{Max-Min}}{\text{Avg}}) \times 100$		4.2%	0.3%	2.2%	0.7%
12/30/71	3	Chassis	231	1.394	1731	1438
12/30/71	4	Chassis	223	1.404	1627	1352
	Average		227	1.399	1679	1395
	Spread $(\frac{\text{Max-Min}}{\text{Avg}}) \times 100$		3.5%	0.7%	6.2%	6.2%
	Average Stationary		214	1.574	1611	1685
	Average Chassis		227	1.399	1679	1395
	Difference*		13	-.175	68	-290
	Percent Difference**		6.1	-11.1	4.22	-17.2

---

*(Chassis-Stationary)

**(Chassis-Stationary) ÷ Stationary X 100

TABLE B-9. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS
Correlation Truck No. 9

Engine: Chevy 292 CID, 6 cyl.

Vehicle: 1970 14,000-lb GVW
Step-in Van

Date	Test	Dynamometer	HC ppm n. Hex.	CO %	NO, ppm Obs.	NO, ppm Corr.
1/25/72	1	Stationary	182	.979	3486	2879
1/25/72	2	Stationary	190	1.040	3527	2786
	Average		186	1.010	3506	2833
	Spread ($\frac{\text{Max-Min}}{\text{Avg}}$) X 100		4.3%	6.0%	1.16%	3.28%
1/21/72	1	Chassis	162	.913	3518	3148
1/21/72	2	Chassis	161	.810	3469	3049
	Average		161.5	.901	3494	3099
	Spread ($\frac{\text{Max-Min}}{\text{Avg}}$) X 100		0.6%	11.4%	1.4%	3.19%
	Average Stationary		186	1.010	3506	2833
	Average Chassis		162	.910	3494	3099
	Difference*		-24	-.100	-22	266
	Percent Difference**		-12.9	-9.9	-0.6	9.38

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*(Chassis-Stationary)

**(Chassis-Stationary) ÷ Stationary X 100

TABLE B-10. STATIONARY-CHASSIS DYNAMOMETER EMISSION TEST RESULTS

Correlation Truck No. 10

Engine: IHC 392 CID V8

Vehicle: 1971 IHC 26,000-lb GVW
Power Line Maintenance Truck

Date	Test	Dynamometer	HC ppm n. Hex.	CO %	NO, ppm	
					Obs.	Corr.
2/7/72	1	Stationary	192	1.24	1527	1206
2/7/72	2	Stationary	206	1.41	1673	1322
2/7/72	4	Stationary	213	1.37	1558	1231
		Average	204	1.34	1586	1253
Spread	$\frac{\text{Max-Min}}{\text{Avg}}$	x 100	10.3%	12.9%	9.2%	9.3%
2/1/72	1	Chassis	259	1.43	(1)	
2/1/72	2	Chassis	244	1.40	1487	1258
2/1/72	3	Chassis	233	1.48	1472	1245
		Average	245	1.44	1479	1252
Spread	$\frac{\text{Max-Min}}{\text{Avg}}$	x 100	10.6%	5.7%	1.0%	1.0%
Average Stationary			204	1.34	1586	1253
Average Chassis			245	1.44	1479	1252
Difference*			41	0.10	-107	-1
Percent Difference**			20.1	7.3	-6.7	-0.1

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*Chassis-Stationary

**(Chassis-Stationary) ÷ Stationary X 100

(1)Instrumentation Malfunction.

APPENDIX C

FEDERAL TEST PROCEDURE FOR EXHAUST EMISSION TESTS OF HEAVY DUTY GASOLINE POWERED TRUCKS

(Excerpted from November 10, 1970, Federal Register)

FEDERAL REGISTER

VOLUME 35 • NUMBER 219

Tuesday, November 10, 1970 • Washington, D.C.

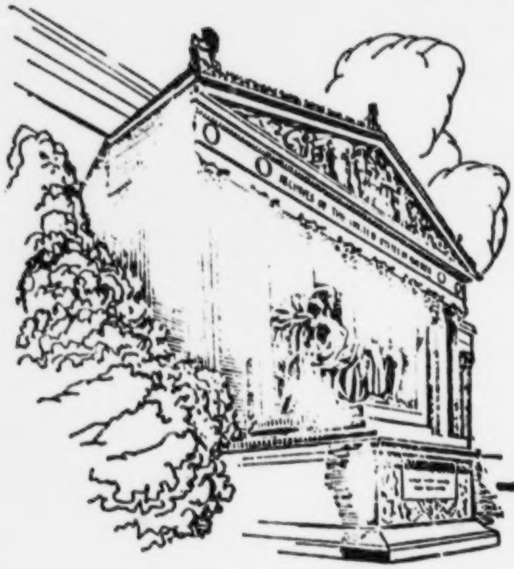
PART II

Department of Health, Education, and Welfare

Office of the Secretary

•

Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines



THE NATIONAL ARCHIVES OF THE UNITED STATES • 1934 •

(4) "Gross vehicle weight" means the manufacturer's gross weight rating.

(5) "Light duty vehicle" means any motor vehicle either designed primarily for transportation of property and rated at 6,000 pounds GVW or less or designed primarily for transportation of persons and having a capacity of 12 persons or less.

(6) "Heavy duty vehicle" means any motor vehicle either designed primarily for transportation of property and rated at more than 6,000 pounds GVW or designed primarily for transportation of persons and having a capacity of more than 12 persons.

(7) "Heavy duty engine" means any engine which the engine manufacturer could reasonably expect to be used for motive power in a heavy duty vehicle.

(8) "Off-road utility vehicle" means a light duty vehicle which incorporates special features for off-road operation such as four-wheel drive.

(9) "Motorcycle" means any light duty vehicle having a seat or saddle for the use of the rider and designed to travel on not more than three wheels (including any tricycle arrangement) in contact with the ground and weighing less than 1,500 pounds.

(10) "Vehicle curb weight" means the actual or the manufacturer's estimated weight of the vehicle in operational status with all standard equipment, and weight of fuel at nominal tank capacity, and the weight of optional equipment computed in accordance with § 85.89(g).

(11) "Loaded vehicle weight" means the vehicle curb weight of a light duty vehicle plus 300 pounds.

(12) "System" includes any motor vehicle engine modification which controls or causes the reduction of substances emitted from motor vehicles or motor vehicle engines.

(13) "Engine family" means the basic classification unit of a manufacturer's product line used for the purpose of test fleet selection and determined in accordance with § 85.89(a).

(14) "Engine-system combination" means an engine family-exhaust emission control system-fuel evaporative emission control system (where applicable) combination.

(15) "Fuel system" means the combination of fuel tank, fuel pump, fuel lines, and carburetor, or fuel injection components, and includes all fuel system vents and fuel evaporative emission control systems.

(16) "Crankcase emissions" means airborne substances emitted to the atmosphere from any portion of the crankcase ventilation or lubrication systems.

(17) "Exhaust emissions" means substances emitted to the atmosphere from any opening downstream from the exhaust port of a motor vehicle engine.

(18) "Fuel evaporative emissions" means vaporized fuel emitted into the atmosphere from the fuel system of a motor vehicle.

(19) "Smoke" means the matter in exhaust emissions which obscures the transmission of light.

(20) "Hot soak loss" means fuel evaporative emissions during the 1-hour hot soak period which begins immediately after the engine is turned off.

(21) "Diurnal breathing loss" means fuel evaporative emissions as a result of the daily range in temperature to which the fuel system is exposed.

(22) "Running loss" means fuel evaporative emissions resulting from an average trip in an urban area or the simulation of such a trip.

(23) "Tank fuel volume" means the volume of fuel in the fuel tank, prescribed to be 40 percent of nominal tank capacity rounded to the nearest whole U.S. gallon.

(24) "Maximum rated horsepower" means the maximum brake horsepower output of an engine as stated by the manufacturer in his sales and service literature and his application for certification under § 85.51.

(25) "Rated speed" means the speed at which the manufacturer specifies the maximum rated horsepower of an engine.

(26) "Maximum rated torque" means the maximum torque produced by an engine as stated by the manufacturer in his sales and service literature and his application for certification under §85.51.

(27) "Opacity" means the fraction of a beam of light, expressed in percent, which fails to penetrate a plume of smoke.

(28) Zero (0) miles means that point after initial engine starting (not to exceed 10 miles of vehicle operation) at which adjustments are completed.

(29) Zero (0) hours means that point after initial engine starting (not to exceed 1 hour of engine operation) at which adjustments are completed.

(30) "Calibrating gas" means a gas of known concentration which is used to establish the response curve of an analyzer.

(31) "Span gas" means a gas of known concentration which is used routinely to set the output of an analyzer.

§ 85.2 Abbreviations.

The abbreviations used in this part have the following meanings in both capital and lower case:

Accel.—Acceleration.
ASTM—American Society for Testing and Materials.
BHP—Brake Horsepower.
C.f.h.—Cubic feet per hour.
CO_2—Carbon Dioxide.
CO—Carbon Monoxide.
Conc.—Concentration.
CT—Closed Throttle.
C.f.m.—Cubic feet per minute.
Cu.in.—Cubic inch(es).
Decel.—Deceleration.
EP—End Point.
Evap.—Evaporated.
F.—Fahrenheit.
FL—Full Load.
Gal.—U.S. Gallon(s).
Gm.—Gram(s).
GVW—Gross Vehicle Weight.
HC—Hydrocarbon(s).
Hg—Mercury.
Hi.—High.
HP.—Horsepower.
IBP—Initial Boiling Point.
ID—Internal Diameter.
Lb.—Pound(s).
Lb.-ft.—Pound-feet.
Max.—Maximum.
Min.—Minimum; also minute(s).
Ml.—Milliliter(s).
M.p.h.—Miles per hour.
Mm.—Millimeter(s).
Mv.—Millivolt(s).
N_2—Nitrogen.
No.—Number.
Pb—Lead.
P.p.m.—Parts per million by volume.
P.s.i.—Pounds per square inch.
P.s.i.g.—Pounds per square inch gauge.
PTA—Part Throttle Accel.
PTD—Part Throttle Decel.
R—Rankine.
R.p.m.—Revolutions per minute.
RS—Rated Speed.
RVP—Reid Vapor Pressure.
S.A.E.—Society of Automotive Engineers.
Sec.—Second(s).
Sp.—Speed.
SS—Stainless Steel.
T—Torque.
TEL—Tetraethyl Lead.
TML—Tetramethyl Lead.
V.—Volts.
Vs.—Versus.
WOT—Wide Open Throttle.
Wt.—Weight.
'—Feet.
''—Inches.
°—Degrees.
%—Percent.

§ 85.3 General standards: increase in emissions; unsafe conditions.

(a) (1) Every new motor vehicle or new motor vehicle engine manufactured for sale, sold, offered for sale, introduced or delivered for introduction into commerce, or imported into the United States for sale or resale which is subject to any of the standards prescribed in this part shall be covered by a certificate of conformity issued pursuant to Subpart F of this part.

(2) No heavy duty vehicle manufacturer shall take any of the actions specified in section 203(a)(1) of the Act with respect to any gasoline fueled or diesel powered heavy duty vehicle which uses an engine which has not been certified as meeting applicable standards. Such manufacturer shall provide to the Secretary prior to the beginning of each model year a statement signed by an authorized representative which includes the following information:

(i) A description of the vehicles which will be produced subject to this section;

(ii) Identification of the engines used in the vehicles;

(iii) Projected sales data on each vehicle-engine combination;

(iv) A statement that the engines will not be modified by the vehicle manufacturer or a detailed specification of any changes which will be made. Changes made solely for the purpose of mounting an engine in a vehicle need not be included.

(b) (1) Any system installed on or incorporated in a new motor vehicle or new motor vehicle engine to enable such vehicle to conform to standards imposed by this part:

(i) Shall not in its operation or function cause the emission into the ambient air of any noxious or toxic substance that would not be emitted in the operation of such vehicle or engine without such system, except as specifically permitted by regulation; and

(ii) Shall not in its operation, function, or malfunction result in any unsafe condition endangering the motor vehicle, its occupants, or persons or property in close proximity to the vehicle.

(2) Every manufacturer of new motor vehicles or new motor vehicle engines subject to any of the standards imposed by this part shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicles or motor vehicle engines in accordance with good engineering practice to ascertain that such test vehicles or engines will meet the requirements of this section for the lifetime of the vehicle or engine as defined in § 85.92, § 85.113, or § 85.133, as appropriate.

§ 85.4 Labeling.

(a) (1) The manufacturer of any light duty motor vehicle subject to any of the standards prescribed in this part shall, at the time of manufacture, affix a permanent, legible label, of the type and in the manner described below, containing the information hereinafter provided, to all production models of such vehicles available for sale to the public and covered by a certificate of conformity under § 85.55(a).

(2) A plastic or metal label shall be welded, riveted, or otherwise permanently attached in a readily visible position in the engine compartment.

(3) The label shall be affixed by the vehicle manufacturer, who has been issued the certificate of conformity for such vehicle, in such a manner that it cannot be removed without destroying or defacing the label, and shall not be affixed to any equipment which is easily detached from such vehicle.

(4) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label:

(i) The label heading: Vehicle Emission Control Information;

(ii) Full corporate name and trademark of manufacturer;

(iii) Engine displacement (in cubic inches) and engine family identification;

(iv) Engine tuneup specifications and adjustments, as recommended by the manufacturer, including idle speed, ignition timing, and the idle air-fuel mixture setting procedure and valve (e.g. idle CO, idle air-fuel ratio, idle speed drop). These specifications should indicate the proper transmission position during tuneup and what accessories (e.g., air-conditioner), if any, should be in operation;

(v) The statement: "This Vehicle Conforms to U.S. Dept. of H.E.W. Regulations Applicable to (insert current year) Model Year New Motor Vehicles."

(b) The manufacturer of any heavy duty gasoline fueled engine shall, at the time of manufacture, affix a permanent, legible plastic or metal label, containing the information hereinafter provided to all production models of such engines available for sale to the public, and covered by a certificate of conformity under § 85.55(a). The label shall be affixed at such a location that it will be readily accessible for inspection after the engine is installed in a vehicle and shall read as follows:

ENGINE EMISSION CERTIFICATION

This engine is, in all material respects, of substantially the same construction as test engines certified by the U.S. Department of Health, Education, and Welfare as conforming to Federal regulations pertaining to crankcase and exhaust emissions.

Engine family identification and engine displacement (in cubic inches) ____________

Date of manufacture ____________________
(Month and year)

Name of manufacturer ____________________

(The information applicable to each engine is to be inserted on the appropriate line.)

(c) The manufacturer of any heavy duty diesel engine shall, at the time of manufacture, affix a permanent, legible plastic or metal label containing the information hereinafter provided to all production models of such engines available for sale to the public, and covered by a certificate of conformity under § 85.55(a). The label shall be affixed at such a location that it will be readily accessible for inspection after the engine is installed in a vehicle and shall read as follows:

ENGINE SMOKE EMISSION CERTIFICATION

This engine is, in all material respects, of substantially the same construction as test engines certified by the U.S. Department of Health, Education, and Welfare as conforming to Federal regulations pertaining to exhaust smoke emission.

Engine family identification and model ____
____

Date of manufacture ____________________
(Month and year)

Name of manufacturer ____________________

(The information applicable to each engine is to be inserted on the appropriate line.)

(d) The provisions of this section shall not prevent a manufacturer from also reciting on the label that such vehicle or engine conforms to any applicable State emission standards for new motor vehicles or new motor vehicle engines or any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vehicle or engine.

§ 85.5 Submission of vehicle identification numbers.

(a) The manufacturer of any light duty motor vehicle covered by a certificate of conformity under § 85.55(a) shall, not later than 60 days after its manufacture, submit to the Secretary the vehicle identification number of such vehicle: *Provided*, That this requirement shall not apply with respect to any vehicle manufactured within any State, as defined in section 302(d) of the Act.

(b) The requirements of this section may be waived with respect to any manufacturer who provides information satisfactory to the Secretary which will enable the Secretary to identify those vehicles or engines which are covered by a certificate of conformity.

§ 85.6 Production vehicles and engines.

(a) Any manufacturer obtaining certification under this part shall supply to the Secretary, upon his request, a reasonable number of production vehicles or engines selected by the Secretary which are representative of the engines, emission control systems, fuel systems, and transmissions offered and typical of production models available for sale under the certificate. These vehicles or engines shall be supplied for testing at such time and place and for such reasonable periods as the Secretary may require. Engines supplied under this paragraph may be required to be mounted in chassis and appropriately equipped for operation on a chassis dynamometer.

(b) Any manufacturer obtaining certification under this part shall notify the Secretary, on a quarterly basis, of the number of vehicles of each engine family - engine displacement - exhaust emission control system-fuel system-transmission type-inertia weight class combination or the number of engines of each engine family-engine displacement-exhaust emission control system-fuel system combination produced for sale in the United States during the preceding quarter. A manufacturer may elect to provide this information every 60 days instead of quarterly, to combine it with the notification required under § 85.5.

(c) All light duty vehicles covered by a certificate of conformity under § 85.55(a) shall be adjusted by the manufacturer to the ignition timing specification detailed in § 85.4(a)(4)(iv).

§ 85.7 Emission control system operation during test.

All emission control systems installed on or incorporated in a new motor vehicle or new motor vehicle engine shall be functioning during all test procedures in this part.

§ 85.8 Special test procedures.

The Secretary may, on the basis of a written application therefor by a manufacturer, prescribe test procedures, other than those set forth in this part, for any motor vehicle or motor vehicle engine which he determines is not susceptible to satisfactory testing by the procedures set forth herein.

§ 85.9 Maintenance of records; submittal of information; right of entry.

(a) The manufacturer of any new motor vehicle or new motor vehicle engine subject to any of the standards prescribed in this part shall establish and maintain the following adequately organized and indexed records:

(1) Identification and description of all vehicles or engines for which testing is required under this part.

(2) A description of all emission control systems which are installed on or incorporated in each vehicle or engine.

(3) A description of the procedures used to test such vehicles or engines.

(4) Test data on each emission data vehicle or engine which will show its emissions at 0 and 4,000 miles or 0 and 125 hours, respectively.

(5) Test data on each durability vehicle or engine which will show the performance of the systems installed on or incorporated in the vehicle or engine during extended mileage or operation, as well as a record of all pertinent maintenance performed on the vehicle or engine.

(b) The manufacturer of any new motor vehicle or new motor vehicle engine subject to any of the standards prescribed in this part shall submit to the Secretary at the time of issuance by the manufacturer copies of all instructions or explanations regarding the use, repair, adjustment, maintenance, or testing of such vehicle or engine relevant to the control of crankcase, exhaust, or evaporative emissions, issued by the manufacturer for use by other manufacturers, assembly plants, distributors, dealers, and ultimate purchasers: *Provided*, That any material not translated into the English language need not be submitted unless specifically requested by the Secretary.

(c) The manufacturer of any new motor vehicle or new motor vehicle engine subject to any of the standards prescribed in this part shall permit officers or employees duly designated by the Secretary, upon presenting appropriate credentials and a written notice to the manufacturer:

(1) To enter, at reasonable times, any premises used during the certification procedure for purposes of monitoring tests and mileage accumulation procedures, observing maintenance procedures, and verifying correlation or calibration of test equipment, or

(2) To inspect, at reasonable times, records, files, and papers compiled by such manufacturer in accordance with paragraph (a) of this section.

A separate notice shall be given for each such inspection, but a separate notice shall not be required for each entry made during the period covered by the inspection. Each such inspection shall be commenced and completed with reasonable promptness.

Subpart B—Crankcase Emissions (Gasoline Fueled Vehicles and Engines)

§ 85.10 Applicability.

The provisions of this subpart are applicable to all new gasoline fueled light duty vehicles, except motorcycles, and heavy duty engines beginning with the 1972 model year for such vehicles and engines.

§ 85.11 Standard for crankcase emissions.

No crankcase emissions shall be discharged into the ambient atmosphere from any new motor vehicle or new motor vehicle engine subject to this subpart.

§ 85.12 Test procedures.

Every manufacturer of new motor vehicles or new motor vehicle engines subject to the standard prescribed in this subpart shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicles or motor vehicle engines in accordance with good engineering practice to ascertain that such test vehicles or engines, with proper maintenance, will meet the requirements of § 85.11 for a period not less than 100,000 miles or 3,000 hours, respectively. If, pursuant to § 85.55 (a), the Secretary issues a certificate of conformity for the class or classes of motor vehicles or motor vehicle engines represented by such test vehicles or engines, any new motor vehicle or motor vehicle engine which is in all material respects of substantially the same construction as such test vehicle or engine shall be deemed to be in conformity with the requirement of § 85.11.

Subpart C—Exhaust Emissions and Fuel Evaporative Emissions (Gasoline Fueled Light Duty Vehicles)

§ 85.20 Applicability.

The provisions of this subpart are applicable to new gasoline fueled light duty motor vehicles beginning with the model year specified therein, except motorcycles and 1972 model year vehicles with an engine displacement of less than 50 cubic inches.

§ 85.21 Standards for exhaust emissions.

(a) Exhaust emissions from 1972, 1973, and 1974 model year vehicles shall not exceed:

(1) Hydrocarbons—3.4 grams per vehicle mile.

(2) Carbon monoxide—39.0 grams per vehicle mile.

(b) The standards set forth in paragraph (a) of this section refer to the exhaust emitted over a driving schedule as set forth in the applicable sections of "Test Procedures for Vehicle Exhaust and Fuel Evaporative Emissions (Gasoline Fueled Light Duty Vehicles)" of this part and measured and calculated in accordance with those procedures.

§ 85.22 Standard for fuel evaporative emissions.

(a) Fuel evaporative emissions from vehicles beginning with the 1972 model year shall not exceed:

(1) Hydrocarbons—2 grams per test.

(b) The standard set forth in paragraph (a) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in the "Test Procedures for Vehicle Exhaust and Fuel Evaporative Emissions (Gasoline Fueled Light Duty Vehicles)" of this part and measured in accordance with those procedures.

§ 85.23 Test procedures.

Every manufacturer of new motor vehicles subject to the standards prescribed in this subpart shall, prior to taking any of the actions specified in section 203 (a)(1) of the Act, test or cause to be tested motor vehicles in accordance with test procedures in Subpart H of this part to ascertain that such test vehicles meet the requirements of §§ 85.21 and 85.22, as applicable. If, pursuant to § 85.55(a), the Secretary issues a certificate of conformity for the class or classes of vehicles represented by such test vehicles, any new motor vehicle which is in all material respects of substantially the same construction as such test vehicles shall be deemed to be in conformity with the requirements of §§ 85.21 and 85.22, as applicable.

Subpart D—Exhaust Emissions (Gasoline Fueled Heavy Duty Engines)

§ 85.30 Applicability.

The provisions of this subpart are applicable to new gasoline fueled heavy model year.

§ 85.31 Standards for exhaust emissions.

(a) Exhaust emissions from new gasoline fueled heavy duty engines shall not exceed:

(1) Hydrocarbons—275 p.p.m.

(2) Carbon monoxide—1.5 percent by volume.

(b) The standards set forth in paragraph (a) of this section refer to a composite sample representing the operating cycles set forth in the applicable sections of "Test Procedures for Engine Exhaust Emissions (Gasoline Fueled Heavy Duty Engines)" of this part and measured in accordance with those procedures.

§ 85.32 Test procedures.

Every manufacturer of new motor vehicle engines subject to the standards prescribed in this subpart shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with test procedures prescribed in Subpart I of this part to ascertain that such test engines meet the requirements of § 85.31. If, pursuant to § 85.55(a), the Secretary issues a certificate of conformity for the class or classes of motor vehicle engines represented by such test engines, any new motor vehicle engine which is in all material respects of substantially the same construction as such test engines shall be deemed to be in conformity with the requirements of § 85.31.

Subpart E—Exhaust Emissions (Heavy Duty Diesel Engines)

§ 85.40 Applicability.

The provisions of this subpart are applicable to new heavy duty diesel engines beginning with the 1972 model year.

§ 85.41 Standards for exhaust smoke.

(a) The opacity of smoke emissions from new diesel engines subject to this subpart shall not exceed:

(1) 40 percent during the engine acceleration mode.

(2) 20 percent during the engine lugging mode.

(b) The standards set forth in paragraph (a) of this section refer to exhaust smoke emissions generated under the conditions set forth in the "Test Procedures for Engine Exhaust Emissions (Heavy Duty Diesel Engines)" of this part and measured and calculated in accordance with those procedures.

vehicle available for such testing under § 85.54 as the Secretary may require before beginning to accumulate mileage on the vehicle. Failure to comply with this requirement will invalidate all test data submitted for this vehicle.

(f) Once a manufacturer begins to operate an emission data or durability data vehicle, as indicated by compliance with paragraph (e) of this section, he shall continue to run the vehicle to 4,000 miles or 50,000 miles, respectively, and the data from the vehicle will be used in the calculations under § 85.92. Discontinuation of a vehicle shall be allowed only with the written consent of the Secretary.

(g) (1) The Secretary may elect to operate and test any test vehicle during all or any part of the mileage accumulation and testing procedure. In such cases, the manufacturer shall provide the vehicle(s) to the Secretary with all information necessary to conduct this testing.

(2) The test procedures (§§ 85.71–85.88) will be followed by the Secretary. The Secretary will test the vehicles at each test point. Maintenance may be performed by the manufacturer under such conditions as the Secretary may prescribe.

(3) The data developed by the Secretary for the engine-system combination shall be combined with any applicable data supplied by the manufacturer on other vehicles of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Secretary and that submitted by the manufacturer, the Secretary's data shall be used in the determination of deterioration factors.

§ 85.92 Compliance with emission standards.

(a) The exhaust and fuel evaporative emission standards in the regulations in this part apply to the average lifetime emissions of vehicles in public use. Prior to certification, lifetime emissions can be obtained by projection of test data to lifetime normal service. Normal service in an urban area or its equivalent for 100,000 miles is taken as the basis for "lifetime emissions."

(b) It is expected that emission control efficiency will change with mileage accumulation on the vehicle. It is assumed that the emission level of a vehicle which has accumulated 50,000 miles in normal service is the average emission level of that vehicle over its lifetime.

(c) The procedure for determining compliance of a new light-duty motor vehicle with exhaust and fuel evaporative emission standards is as follows:

(1) Separate emission deterioration factors shall be determined from the emission results of the durability data vehicles for each engine-system combination. A separate factor shall be established for the combination for exhaust HC, exhaust CO, and fuel evaporative HC.

(i) The applicable results to be used in determining the deterioration factors for each combination shall be:

(a) All emission data from the tests required under § 85.91(b), except the zero mile tests. This shall include the official test results, as determined in § 85.54, for all tests conducted on all durability vehicles of the combination selected under § 85.89(c) (including all vehicles elected to be operated by the manufacturer under § 85.89(c)(3)). Where the Secretary has agreed to a mileage less than 50,000 miles in accordance with § 85.91(b), the data for mileages greater than that actually run will be determined by extrapolating the test data generated at lesser mileages.

(b) All emission data from the tests conducted before and after the maintenance provided in § 85.90(a)(1)(i).

(ii) All applicable results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through these data points. The interpolated 4,000- and 50,000-mile points on this line must be within the standards provided in §§ 85.21 and 85.22 or the data will not be acceptable for use in calculation of a deterioration factor.

(iii) An exhaust emission deterioration factor shall be calculated for each combination as follows:

$$\text{factor}=\frac{\text{exhaust emissions interpolated to 50,000 miles}}{\text{exhaust emissions interpolated to 4,000 miles}}$$

(iv) An evaporative emission deterioration factor shall be calculated for each combination by substracting the evaporative emissions interpolated to 4,000 miles from the evaporative emissions interpolated to 50,000 miles.

(2) (i) The exhaust emission test results for each emission data vehicle shall be multiplied by the appropriate deterioration factor: *Provided*, That if a deterioration factor as computed in subparagraph (1)(iii) of this paragraph is less than one, that deterioration factor shall be one for the purposes of this subparagraph.

(ii) The evaporative emission test results for each combination shall be adjusted by addition of the appropriate deterioration factor: *Provided*, That if a deterioration factor as computed in subparagraph (1)(iv) of this paragraph is less than zero, that deterioration factor shall be zero for the purposes of this subparagraph.

(3) The emissions to compare with the standard shall be the adjusted emissions of subparagraph (2)(i) and (ii) of this paragraph for each emission data vehicle.

(4) Every test vehicle of an engine family must comply with all applicable standards, as determined in subparagraph (3) of this paragraph, before any vehicle in that family may be certified.

Subpart I—Test Procedures for Engine Exhaust Emissions (Gasoline Fueled Heavy Duty Engines)

§ 85.100 Introduction.

The procedures described in this subpart will be the test program to determine the conformity of new gasoline fueled heavy duty engines with the applicable standards set forth in this part.

(a) The test consists of prescribed sequences of engine operating conditions to be conducted on an engine dynamometer. The exhaust gases generated during engine operation are sampled continuously for specific component analysis through the analytical train. The tests are applicable to engines equipped with catalytic or direct-flame afterburners, induction system modifications, or other systems, or to uncontrolled engines.
signed to determine hydrocarbon and carbon monoxide concentrations during a truck driving pattern in a metropolitan area as simulated on an engine dynamometer. The test consists of two warmup cycles and two hot cycles. The average concentrations for the warmup cycles and the hot cycles are combined to yield the reported values.

(c) When an engine is tested for exhaust emissions or is operated for durability testing on an engine dynamometer the complete engine shall be used with all accessories which might reasonably be expected to influence emissions to the atmosphere installed and functioning.

§ 85.101 Gasoline fuel specifications.

(a) For exhaust emission testing, fuel having specifications as shown in the table in § 85.71(a), or substantially equivalent specifications approved by the Secretary, shall be used.

(b) For durability testing, fuel having specifications as shown in the table in § 85.71(b), or substantially equivalent specifications approved by the Secretary, shall be used. The octane rating of the fuel used shall be in the range recommended by the engine manufacturer. The specifications of the fuel to be used shall be reported in accordance with § 85.51(b)(3).

§ 85.102 Dynamometer operation cycle and equipment.

(a) (1) The following nine-mode cycle shall be followed in dynamometer operation tests of gasoline fueled heavy duty engines.

Sequence No.	Mode	Manifold vacuum	Time in Mode-Secs.	Cumulative Time-Secs.	Weighting factors
1	Idle		70	70	0.036
2	Cruise	16" Hg	23	93	.069
3	PTA	10" Hg	44	137	.257
4	Cruise	16" Hg	23	160	.069
5	PTD	19" Hg	17	177	.047
6	Cruise	16" Hg	23	200	.069
7	FL	3" Hg	34	234	.283
8	Cruise	16" Hg	23	257	.069
9	CT		43	300	.021

(2) The engine dynamometer shall be operated at a constant speed of 2,000 r.p.m.±100 r.p.m. (exception: representative engine speed for a given displacement engine as determined by its application, but not less than 1,800 r.p.m. nor greater than 2,500 r.p.m.).

(3) The idle operating mode shall be carried out at the manufacturer's recommended engine speed. The CT operating mode shall be carried out at the same engine speed as in subparagraph (2) of this paragraph.

(b) The following equipment shall be used for dynamometer tests.

(1) An engine dynamometer capable of maintaining constant speed±100 r.p.m. from full throttle to closed throttle motoring.

(2) A chassis-type exhaust system or substantially equivalent exhaust system, shall be used.

(3) A radiator typical of that used with the engine in a vehicle, or other means of engine cooling which will maintain the engine operating temperatures at approximately the same temperature as would the radiator, shall be used. An auxiliary fixed speed fan may be used to maintain engine cooling during sustained operation on the dynamometer.

§ 85.103 Dynamometer procedures.

An initial 5-minute idle, two warmup cycles, and two hot cycles constitute a complete dynamometer run. Idle modes may be run at the beginning and end of each test, thus eliminating the need to change speed between cycles. One idle mode preceding the first cycle and one following the fourth cycle is sufficient. The results of the first idle shall be used for calculation of the second cycle emissions and the fourth idle results shall be used for calculation of the third cycle emissions.

§ 85.104 Sampling and analytical system for measuring exhaust emissions.

(a) *Schematic drawing.* The following (fig. 6) is a schematic drawing of the exhaust gas sampling and analytical system which shall be used for testing under the regulations in this subpart.

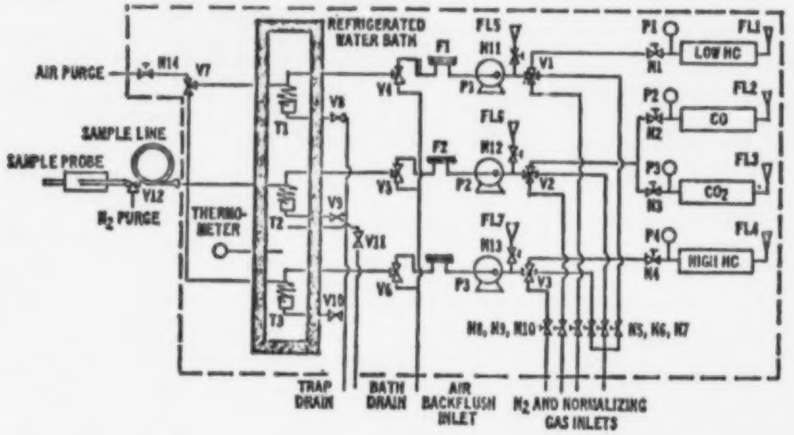


Figure 6. Flow schematic of exhaust gas analysis system employed in Federal facilities.

(b) *Component description.* The following components shall be used in sampling and analytical systems for testing under the regulations in this part.

(1) Flowmeters FL1, FL2, FL3, and FL4 indicate the sample flow rate through the analyzers.

(2) Low range hydrocarbon analyzer.

(3) Carbon monoxide analyzer.

(4) Carbon dioxide analyzer.

(5) High range hydrocarbon analyzer.

(6) Pressure gauges P1, P2, and P3 indicate the analyzer sample pressure.

(7) Needle valves N1, N2, N3, and N4 regulate sample flow rate to the analyzers.

(8) Needle valves N5, N6, N7, N8, N9, and N10 regulate the flow rates of N_2 and normalizing gases to the analyzers.

(9) Ball valves V1, V2, and V3 for directing either sample or calibration gases to the analyzers.

(10) Needle valves N11, N12, and N13 regulate the sample flow rate through the bypass network.

(11) Flowmeters FL5, FL6, and FL7 indicate the flow rate through the bypass system.

(12) Pumps P1, P2, and P3 for pulling sample from source.

(13) Filters F1, F2, and F3 remove contaminants from sample prior to analysis.

(14) Ball valves V4, V5, and V6 for directing sample to the analyzer or directing air in the reverse direction as a backflush.

(15) Toggle valves V8, V9, V10, and V11 for draining condensate traps and refrigerated bath.

(16) Traps T1, T2, and T3 for condensing water vapor and cooling exhaust sample.

(17) Ball valve V7 for diverting air to low HC analyzer during periods of high hydrocarbon response.

(18) Needle valve N14 for regulating air flow to low hydrocarbon analyzer during purge conditions.

(19) Thermometer for indicating bath temperature.

(20) Refrigerated water bath for condensing water vapor and cooling exhaust sample.

(21) Sample line from vehicle to analysis system.

(22) Sample probe to extract exhaust gas sample downstream of muffler.

(23) Ball valve V12 for directing N_2 to hydrocarbon analyzers.

(c) *Hang up reduction.* Stringent methods to reduce hang up may be employed. All methods must be approved in advance by the Secretary.

§ 85.105 Information to be recorded on charts.

The following information shall be recorded with respect to each test:

(a) Test number.

(b) System tested (brief description).

(c) Date and time of day for each part of the test schedule.

(d) Instrument Operator.

(e) Driver or Operator.

(f) Engine Make—identification number—date of manufacture—number of hours — engine displacement — engine family—idle r.p.m.—number carburetors—number of carburetor venturis.

(g) All pertinent instrument information such as tuning—gain—serial numbers—detector numbers—range.

(h) Recorder Charts: Identify zero, span, exhaust gas sample traces.

(i) Barometric pressure, intake air temperature and humidity and, as applicable, the temperature of the air in front of the radiator during the test.

(j) A continuous trace of intake manifold vacuum and engine r.p.m., recorded on the same chart with an automatic marker indicating one second intervals.

§ 85.106 Calibration and instrument checks.

(a) The instrument assembly shall be calibrated at least once every 30 days, using the same flow rate as when sampling exhaust and proceeding as follows:

(1) Tune analyzers.

(2) Zero on nitrogen: Check each cylinder of N_2 for contamination with hy-

drocarbons. Set the instrument gain to give the desired range. Normal operating ranges are as follows:

Low-Range Hydrocarbon Analyzer.	0–1,000 p.p.m. hexane equivalent.
High-Range Hydrocarbon Analyzer.	0–10,000 p.p.m. hexane equivalent.
CO Analyzer	0–10% CO.
CO_2 Analyzer	0–16% CO_2.

(3) Calibrate with the following normalizing gases. Flow rates should be set at 10 c.f.h. on the hydrocarbon analyzers and 5 c.f.h. on the carbon monoxide and carbon dioxide analyzers. The concentrations given indicate nominal concentrations, and actual concentrations should be known to within ±2 percent of true value. Prepurified N_2 is used as the diluent.

Low range HC analyzer	High range HC analyzer	CO and CO_2 analyzers		
		Blend of CO and CO_2 containing:		
Hexane equivalent [1]	*Hexane equivalent*	*Mole percent CO*	Plus	*Mole percent CO_2*
100 p.p.m.	500 p.p.m.	0.5		16.0
200 p.p.m.	1,000 p.p.m.	1.0		15.0
300 p.p.m.	1,500 p.p.m.	2.0		14.0
400 p.p.m.	2,500 p.p.m.	3.0		13.0
600 p.p.m.	4,000 p.p.m.	4.0		12.0
800 p.p.m.	6,000 p.p.m.	6.0		10.0
1,000 p.p.m.	8,000 p.p.m.	8.0		8.0
	10,000 p.p.m.	10.0		6.0

[1] The hexane equivalent of propane, when used as the normalizing gas for calibrating nondispersive infrared analyzers, is prescribed to be 0.52 (Propane Concentration×0.52 = Hexane Equivalent Concentration).

Minimum storage temperature of the cylinders shall be 60° F.; minimum use temperature shall be 68° F.

(4) Compare values with previous curves. Any significant change reflects some problem in the system. Locate and correct problem, and recalibrate. Use best judgment in selecting curve for data reduction.

(5) Check response of hydrocarbon analyzer to 100 percent CO_2. If response is greater than 0.5 percent full scale, refill filter cells with 100 percent CO_2 and recheck. Note any remaining response on chart. If response still exceeds 0.5 percent, replace detector.

(6) Check response of hydrocarbon analyzers to nitrogen saturated with water at ambient temperature. Record ambient temperature. If the low-range instrument response exceeds 5 percent of full scale with saturated nitrogen at 75° F., replace the detector. If the high-range response exceeds 0.5 percent of full scale, check detector on low-range instrument, then reject if response exceeds 5 percent of full scale at 75° F.

(b) The following daily instrument check shall be performed, allowing a minimum of 2 hours warmup for infrared analyzers. (Power is normally left on continuously; but, when instruments are not in use, chopper motor is turned off.):

(1) Zero on clean nitrogen introduced at analyzer inlet. Obtain a stable zero on the amplifier meter and recorder. Recheck after test.

(2) Introduce normalizing gas and set gain to match calibration curve. In order to avoid a correction for sample cell pressure, normalize and calibrate at the same flow rates used for exhaust sampling. Normalizing or span gases: (See paragraph (a)(3) of this section for allowable variation.)

Low-Range Hydrocarbon Analyzer.	1,000 p.p.m. hexane equivalent in prepurified N_2.
High-Range Hydrocarbon Analyzer.	10,000 p.p.m. hexane equivalent in prepurified N_2.
CO Analyzer	10% CO in prepurified N_2.
CO_2 Analyzer	12 to 16% CO_2 in prepurified N_2.

If gain has shifted significantly, check tuning. If necessary, check calibration. Recheck after test. Record actual concentrations on chart.

(3) Check nitrogen zero, repeat the procedure in subparagraphs (1) and (2) of this paragraph if required.

(4) Check flow rates and pressures.

§ 85.107 Dynamometer test run.

(a) The engine shall be allowed to stand with engine turned off for at least 1 hour before the exhaust emission test at an ambient temperature of 60° F. to 86° F. The engine shall be stored prior to the emission tests in such a manner that it is not exposed to precipitation or condensation. During the dynamometer run, the ambient temperature shall be between 68° F. and 86° F.

(b) The following steps shall be taken for each test:

(1) Mount test engine on the engine dynamometer.

(2) Calibrate exhaust emission analyzer assembly.

(3) Start cooling system, if it is to be used.

(4) Start engine and idle at 1,000–1,200 r.p.m. for 5 minutes.

(5) Obtain normal idle speed, record it, and start exhaust sampling.

(6) Run four 9-mode cycles.

(c) Upon completion of the test, purge the sample line with nitrogen to establish a constant hydrocarbon "hangup" level. The hydrocarbon concentration shall drop to 5 percent of scale in 10 seconds, and 3 percent of scale in 3 minutes, or the test is invalid. Check calibration of exhaust emission instruments. A drift in excess of ±2 percent of scale in the calibration of any one of the exhaust emission analyzers will invalidate the test results.

§ 85.108 Chart reading.

The recorder response for measuring exhaust gas concentrations always lags the engine's operation because of a variable exhaust system delay and a fixed sample system delay. Therefore, the concentrations for each mode will not be located on the charts at a point corresponding to the exact time of the mode. For each warmup or hot cycle to be evaluated, proceed as follows:

(a) Determine whether the cycle was run in accordance with the specified cycle timing by observing either chart pips, speed trace, manifold vacuum trace, or concentration traces. Deviation by more than 2 seconds from the specified time for the closed throttle mode (sequence 9) or deviation of more than ±0.2" Hg from the specified mode vacuums during the last 10 seconds of a mode will invalidate the data.

(b) Time correlate the hydrocarbon, carbon monoxide, and carbon dioxide charts. Determine the location on the chart of concentrations corresponding to each mode. Determine and compensate for trace abnormalities.

(c) For all open throttle (3", 10", 16", and 19" Hg) and idle modes, integrate the last 3 seconds of the HC, CO and CO_2 traces.

(d) The values recorded for the initial idle mode are used for both warmup cycles 1 and 2. The final idle mode values are applied to hot cycles 3 and 4.

(e) Intergrate the complete HC, CO, and CO_2 traces during this 43-second closed throttle mode of each cycle.

(f) Direct computer analysis of analyzer output may be utilized provided that the analysis is sufficiently similar to the above procedures to result in comparable data results.

§ 85.109 Calculations.

The final reported test results shall be derived through the following steps:

(a) Determine composite hydrocarbon and carbon monoxide concentrations for the first and second cycles. Average the results of these two cycles.

(b) Determine composite hydrocarbon and carbon monoxide concentrations for the third and fourth cycles. Average the results of these two cycles.

(c) Combine the results of paragraphs (a) and (b) of this section according to the formula: 0.35(a) plus 0.65(b). Since hydrocarbon, carbon monoxide, and carbon dioxide are all measured with essentially the same moisture content, no moisture correction is required to convert the results to a dry basis. The correction factor:

$$\frac{14.5}{\%\ CO_2 + (0.5)\ \%\ CO + (1.8 \times 6)\ \%\ HC}$$

shall be applied to the measured concentrations of hydrocarbon and carbon monoxide to correct these observed values for dilution of the exhaust.

§ 85.110 Test engines.

(a) The engines covered by the application for certification will be divided into engine families based upon the criteria outlined in § 85.89(a).

(b) Emission data engines:

(1) Engines will be chosen to be run for emission data based upon the engine family groupings. Within each engine

family, the requirements of this paragraph must be met.

(2) Engines of each engine family will be divided into engine displacement-exhaust emission control system combinations. A projected sales volume will be established for each combination for the model year for which certification is sought. One engine of each combination will be selected in order of decreasing projected sales volume until 70 percent of the projected sales of a manufacturer's total production of engines of that family is represented, or until a maximum of four engines is selected. The engines selected for each combination will be specified by the Secretary as to fuel system.

(3) The Secretary may select a maximum of two additional engines within each engine family based upon features indicating that they may have the highest emission levels of the engines in that engine family. In selecting these engines, the Secretary will consider such features as the exhaust emission control system, induction system characteristics, ignition system characteristics, fuel system, rated horsepower, rated torque, and compression ratio.

(4) If the engines selected in accordance with subparagraphs (2) and (3) of this paragraph do not represent each engine-system combination, then one engine of each engine-system combination not represented shall be selected by the Secretary. The engine selected shall be of the displacement with the largest projected sales volume of engines with the exhaust emission control system in the family and will be designated by the Secretary as to fuel system.

(c) Durability data engines:

(1) A durability data engine will be selected by the Secretary to represent each engine-system combination. The engine selected shall be of the displacement with the largest projected sales volume of engines with that exhaust emission control system in that engine family and will be designated by the Secretary as to fuel system.

(2) If an exhaust emission control system is used in only one engine family, an additional engine using that control system in that family will be selected so that the durability data fleet shall contain at least two engines with each control system. The additional engine will be selected in the same manner as engines selected under subparagraph (1) of this paragraph.

(3) A manufacturer may elect to operate and test additional engines to represent any engine-system combination. The additional engines must be of the same engine displacement and fuel system as the engine selected for that combination in accordance with the provisions of subparagraph (1) of this paragraph. Notice of an intent to run additional engines shall be given to the Secretary not later than 30 days following notification of the test fleet selection.

(d) Any manufacturer whose projected sales of new motor vehicle engines subject to this subpart for the model year for which certification is sought is less than 700 engines may request a reduction in the number of test engines determined in accordance with the foregoing provisions of this section. The Secretary may agree to such lesser number as he determines will meet the objectives of this procedure.

(e) In lieu of testing an emission data or durability data vehicle selected under paragraph (b) or (c) of this section and submitting data therefor, a manufacturer may, with the prior written approval of the Secretary, submit data on a similar vehicle for which certification has previously been obtained.

§ 85.111 Maintenance.

(a) (1) Maintenance on the engines and fuel systems of durability engines may be performed only under the following provisions:

(i) Two major engine tuneups to manufacturer's specifications may be performed at 500 and 1,000 hours (±8 hours) of scheduled dynamometer operation with the following exception: On engines with a displacement of 200 cubic inches or less, a major engine tuneup may be performed at 375, 750, and 1,125 hours (±8 hours) of scheduled dynamometer operation. A major engine tuneup shall be restricted to the following:

(*a*) Replace spark plugs.

(*b*) Inspect ignition wiring and replace as required.

(*c*) Replace distributor breaker points and condensor as required.

(*d*) Lubricate distributor cam.

(*e*) Check distributor advance and breaker point dwell angle and adjust as required.

(*f*) Check automatic choke for free operation and correct as required.

(*g*) Adjust carburetor idle speed and mixture.

(*h*) Adjust drive belt tension on engine accessories.

(*i*) Adjust valve lash if required.

(*j*) Check exhaust heat control valve for free operation.

(*k*) Check engine bolt torque and tighten as required.

(ii) Spark plugs may be changed if a persistent misfire is detected.

(iii) Normal services (engine oil change, and oil filter, fuel filter and air filter servicing) will be allowed at manufacturer's recommended intervals.

(iv) The crankcase emission control system may be serviced at 375-hour intervals (±8 hours) of dynamometer operation.

(v) Readjustment of the engine choke mechanism or idle settings may be performed only if there is a problem of stalling at idle.

(vi) Leaks in the fuel system, engine lubrication system and cooling system may be repaired.

(vii) Any other engine or fuel system maintenance or repairs will be allowed only with the advance approval of the Secretary.

(2) Allowable maintenance on emission data engines shall be limited to the adjustment of engine idle speed at the 125-hour test point.

(b) Complete emission tests (see §§ 85.101-85.109) shall be run before and after any engine maintenance which may reasonably be expected to affect emissions. These test data shall be supplied to the Secretary immediately after the tests, along with a complete record of all pertinent maintenance, including an engineering report of any malfunction diagnosis and the corrective action taken. In addition, all test data and maintenance reports shall be compiled and provided to the Secretary in accordance with §85.53.

(c) If the Secretary determines that maintenance or repairs have resulted in a substantial change to the engine-system combination, the engine shall not be used as a durability data engine.

§ 85.112 Service accumulation and emission measurements.

The engine dynamometer service accumulation schedule will consist of several operating conditions which give the same percentage of time at various manifold vacuums and the modes as specified in the emission test cycle. The average speed shall be between 1,650 and 1,700 r.p.m. with some operation at 3,200 r.p.m. or governed speed, whichever is lower. Maximum cycle time shall be 15 minutes. A cycle approved in advance by the Secretary shall be used.

(a) Emission data engines: Each emission data engine shall be operated for 125 hours with all emission contol systems installed and operating. Emission tests shall be conducted at zero and 125 hours.

(b) Durability data engines: Each durability data engine shall be operated, with all emission control systems installed and operating, for 1,500 hours. Emission measurements, as prescribed, shall be made at zero hours and at each 125-hour interval.

(c) All tests required by this subpart to be conducted after 125 hours of operation or at any multiple of 125 hours may be conducted at any accumulated number of hours within 8 hours of 125 hours or the appropriate multiple of 125 hours, respectively.

(d) The results of each emission test shall be supplied to the Secretary immediately after the test. In addition, all test data shall be compiled and provided to the Secretary in accordance with § 85.53.

(e) Whenever the manufacturer proposes to operate and test an engine which may be used for emission or durability data, he shall provide the zero-hour test data to the Secretary and make the engine available for such testing under § 85.54 as the Secretary may require, before beginning to accumulate hours on the engine. Failure to comply with this requirement will invalidate all test data later submitted for this engine.

(f) Once a manufacturer begins to operate an emission data or durability data engine, as indicated by compliance with paragraph (c) of this section, he shall continue to run the engine to 125 hours or 1,500 hours, respectively, and the data from the engine will be used in the calculations under § 85.113. Discontinuation of an engine shall be allowed only with the prior written consent of the Secretary.

§ 85.113 Compliance with emission standards.

(a) The exhaust emission standards in the regulations in this part apply to the average lifetime emissions of engines in public use. Prior to certification, lifetime emissions can be obtained by projection of test data to lifetime normal service. Normal service in an urban area or its equivalent for 100,000 miles is taken as the basis for "lifetime emissions." Operation on an engine dynamometer in the prescribed manner for 3,000 hours is taken to be equivalent to such service.

(b) It is expected that emission control efficiency will change with the accumulation of hours on the engine. It is assumed that the emission level of an engine which has accumulated 1,500 hours of dynamometer operation is the average emission level of that engine over its lifetime.

(c) The procedure for determining compliance of a new engine with exhaust emission standards is as follows:

(1) Separate emission deterioration factors shall be determined from the emission results of the durability data engines for each engine-system combination. Separate factors shall be established for HC and CO for each combination.

(i) The applicable results to be used in determining the deterioration factors for each combination shall be:

(a) All emission data from the tests required under § 85.112(b), except the zero-hour tests. This shall include the official test results, as determined in § 85.54, for all tests conducted on all durability engines of the combination selected under § 85.110(c) (including all engines elected to be operated by the manufacturer under § 85.110(c)(3)).

(b) All emission data from the tests conducted before and after the maintenance provided in § 85.111(a)(1)(i).

(ii) All applicable results shall be plotted as a function of the hours on the system, rounded to the nearest hour, and the best fit straight lines, fitted by the method of least squares, shall be drawn through these data points. The interpolated 125- and 1,500-hour points on this line must be within the standard provided in § 85.31 or the data shall not be used in calculation of a deterioration factor.

(iii) An exhaust emission deterioration factor shall be calculated for each combination as follows:

$$\text{factor} = \frac{\text{exhaust emissions interpolated to 1,500 hours}}{\text{exhaust emissions interpolated to 125 hours}}$$

(2) The exhaust emission test results for each emission data engine shall be multiplied by the appropriate deterioration factor: *Provided*, That if a deterioration factor as computed in subparagraph (1) of this paragraph is less than one, that deterioration factor shall be one for the purposes of this subparagraph.

(3) The emissions to compare with the standard shall be the adjusted emissions of subparagraph (2) of this paragraph for each emission data engine.

(4) Every test engine of an engine family must comply with all applicable standards, as determined in subparagraph (3) of this paragraph, before any engine in that family will be certified.

Subpart J—Test Procedures for Engine Exhaust Emissions (Heavy Duty Diesel Engines)

§ 85.120 Introduction.

(a) The procedures described in this subpart will be the test program to determine the conformity of heavy duty diesel engines with the applicable standards set forth in this part:

(b) The test consists of a prescribed sequence of engine operating conditions on an engine dynamometer with continuous examination of the exhaust gases. The test is applicable equally to controlled engines equipped with means for preventing, controlling, or eliminating smoke emissions and to uncontrolled engines.

(c) The test is designed to determine the opacity of smoke in exhaust emissions during those engine operating conditions which tend to promote smoke from diesel-powered vehicles.

(d) The test procedure begins with a warm engine which is then run through preloading and preconditioning operations. After an idling period, the engine is operated through acceleration and lugging modes during which smoke emission measurements are made to compare with the standards. The engine is then returned to the idle condition and the acceleration and lugging modes are repeated. Three sequences of acceleration and lugging constitute the full set of operating conditions for smoke emission measurement.

§ 85.121 Diesel fuel specifications.

(a) The diesel fuels employed shall be clean and bright, with pour and cloud points adequate for operability. The fuels may contain nonmetallic additives as follows: cetane improver, metal deactivator, antioxidant, dehazer, antirust, pour depressant, dye, and dispersant.

(b) Fuel meeting the following specifications, or substantially equivalent specifications approved by the Secretary, shall be used in exhaust emission testing. The grade of fuel recommended by the engine manufacturer, commercially designated as "Type 1-D" or "Type 2-D", shall be used.

Item	ASTM test method No.	Type 1-D	Type 2-D
Cetane	D 613	48-54	42-50
Distillation range	D 86		
IBP, °F		330-390	340-400
10 percent point, °F		370-430	400-460
50 percent point, °F		410-480	470-540
90 percent point, °F		460-520	550-610
EP, °F		500-560	580-640
Gravity, ° API	D 287	40-44	33-37
Total sulfur, percent	D 129 or D 2622	0.05-0.20	0.2-0.5
Hydrocarbon composition	D 1319		
Aromatics, percent		8-15	27 (Min.)
Paraffins, Naphthenes, Olefins		Remainder	Remainder
Flash point, °F (Min.)	D 93	120	130
Viscosity, centistokes	D 445	1.6-2.0	2.0-3.2

(c) Fuel meeting the following specifications, or substantially equivalent specifications approved by the Secretary, shall be used in service accumulation. The grade of fuel recommended by the engine manufacturer, commercially designated as "Type 1-D" or "Type 2-D", shall be used.

Item	ASTM test method No.	Type 1-D	Type 2-D
Cetane	D 613	48-54	42-55
Distillation range	D 86		
IBP, °F		330-390	340-410
10 percent point, °F		370-430	400-470
50 percent point, °F		410-480	470-540
90 percent point, °F		460-530	550-610
EP, °F		500-560	580-660
Gravity, ° API	D 287	40-44	33-43
Total sulfur, percent	D 129 or D 2622	0.05-0.20	0.2-0.5
Flash point, °F (Min.)	D 93	120	130
Viscosity, centistokes	D 445	1.6-2.0	2.0-3.2

(d) The type fuel, including additive and other specifications, used under paragraphs (b) and (c) of this section shall be reported in accordance with § 85.51(b)(3).

§ 85.122 Dynamometer operation cycle for smoke emission tests.

(a) The following sequence of operations shall be performed during engine dynamometer testing of smoke emissions, starting with the dynamometer preloading determined and the engine preconditioned (§ 85.127(c)).

(1) *Idle mode.* The engine is caused to idle for 5 to 5.5 minutes at the manufacturer's recommended low idle speed. The dynamometer controls shall be set to provide minimum load by turning the load switch to the "off" position or by adjusting the controls to the minimum load position.

(2) *Acceleration mode.* (i) The engine speed shall be increased to 200±50 r.p.m. above the manufacturer's recommended low idle speed within 3 seconds.

(ii) The engine shall be accelerated at full-throttle against the inertia of the engine and dynamometer or alternately against a preselected dynamometer load such that the engine speed reaches 85 to 90 percent of rated speed in 5±1.5 seconds.

APPENDIX D

RESULTS OF SURVEILLANCE TEST BY INSPECTION ROUND

TABLE D-1. VEHICLE DESCRIPTION AND FIRST ROUND EMISSION RESULTS 18 MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF JULY 6, 1971)

Unit No.	Date Tested	Truck No	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW lbs.	Vehicle Type	Test Mileage	Emission Results HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
1	10-22-70	P041001	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	8	198	1.44	1019	857	1
2	10-22-70	P040999	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	19	226	2.07	1192	1.02	2
3	10-23-70	P040997	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	21	209	2.05	818	688	3
4	10-23-70	P041000	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	38	216	2.06	1044	878	4
5	10-23-70	P041002	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Van	22	173	1.89	656	552	5
6	11-18-70	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9245	189	1.49	2221	2387	6
7	11-19-70	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9109	182	4.49	1213	1316	7
8	11-20-70	351	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9178	166	2.04	1725	1450	8
9	11-23-70	350	ABC	1970	White	400	6	5 Hi-Lo	40,000	Tractor	9010	96	1.67	1902	1676	9
10	11-24-70	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	9552	138	2.54	1647	1385	10
11	11-25-70	24340	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	163	296	1.61	1439	1474	11
12	11-27-70	24341E	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	56	253	1.21	1605	1767	12
13	11-27-70	24343	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	2730	229	1.82	1419	1563	13
14	11-27-70	24342	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	1259	255	1.15	1719	1701	14
15	11-30-70	56	N. S. S. D.	1970	IHC	345	V8	5	25,500	School Bus	4136	250	1.30	2186	2281	15
16	12-1-70	53	N. S. S. D.	1970	IHC	345	V8	5	25,500	School Bus	4037	284	1.22	2305	2330	16
17	12-2-70	55	N. S. S. D.	1970	IHC	345	V8	5	25,500	School Bus	3620	236	1.05	2294	2453	17
18	12-3-70	5	N. S. S. D.	1970	IHC	345	V8	5	22,000	School Bus	4197	272	1.13	2477	2572	18
19	12-4-70	54	N. S. S. D.	1970	IHC	345	V8	5	22,000	School Bus	3961	345	1.59	2141	2187	19
20	12-3-70	72341	Hertz	1970	Ford	300	6	3 auto	10,000	Stake	7361	170	0.54	2796	2846	20
21	12-4-70	72218	Hertz	1970	Ford	240	6	3 auto	7,500	Pickup	9108	261	0.45	2356	2445	21
22	12-4-70	5131	C. P. S. B.	1971	IHC	392	V8	3 auto	25,500	Line	44	273	2.61	960	997	22
23	12-4-70	5132	C. P. S. B.	1970	IHC	392	V8	3 auto	25,500	Line	43	271	181	1221	1272	23
24	12-7-70	5136	C. P. S. B.	1971	IHC	392	V8	3 auto	25,500	Line	37	262	1.34	1289	1219	24
25	12-7-70	514.	C. P. S. B.	1971	IHC	392	V8	3 auto	25,500	Line	29	148	2.04	602	604	25
26	12-4-70	4952	C. P. S. B.	1971	IHC	304	V8	4	14,000	Van	34	252	1.21	2013	2089	26
27	12-7-70	6615	C. P. S. B.	1970	Ford	300	6	4	10,000	Service	365	223	0.56	1676	1708	27
28	12-7-70	6616	C. P. S. B.	1970	Ford	300	6	4	10,000	Service	415	192	0.36	1580	1487	28
29	12-8-70	4824	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	2103	209	0.59	2923	2934	29
30	12-8-70	4726	C. P. S. B.	1970	Chev	292	6	4	9,000	Service	4356	244	1.15	2184	2193	30
31	12-10-70	4728	C. P. S. B.	1970	Chev	250	6	4	7,500	Service	3000	266	1.46	2346	2419	31
32	12-10-70	4729	C. P. S. B.	1970	Chev	250	6	4	7,500	Service	1274	274	1.69	2189	2228	32
33	12-10-70	671	Brown Exp.	1971	Ford	300	6	5	24,000	Freight Van	20	209	1.07	2234	2192	33
34	12-10-70	672	Brown Exp.	1971	Ford	300	6	5	24,000	Freight Van	27	138	0.32	2154	2151	34
35	12-10-70	673	Brown Exp.	1971	Ford	300	6	5	24,000	Freight Van	12	149	0.65	2113	2108	35
36	12-10-70	4727	C. P. S. B.	1970	Chev	250	6	4	7,500	Service	2228	249	1.27	2336	2329	36
37	12-10-70	4730	C. P. S. B.	1970	Chev	250	6	4	7,500	Service	841	263	1.19	2462	2455	37
38	12-11-70	4951	C. P. S. B.	1970	IHC	304	V8	4	14,000	Service	1549	253	0.78	2916	2363	38
39	12-11-70	8810	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	1677	184	0.69	1884	1508	39
40	12-14-70	8811	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	1227	174	0.54	3165	3007	40
41	12-14-70	6855	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	343	146	0.53	1730	1698	41
42	12-15-70	6617	C. P. S. B.	1970	Ford	300	6	4	10,000	Wrecker	414	176	0.48	1112	1065	42
43	12-15-70	6856	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	2770	171	0.83	2592	2583	43
44	12-16-70	4671	C. P. S. B.	1970	Ford	300	6	4	10,000	Stake	1142	171	0.35	2600	2312	44
45	12-16-70	6857	C. P. S. B	1970	Ford	300	6	4	16,000	Service	3357	197	0.78	2263	1975	45
46	12-17-70	4950	C. P. S. B.	1970	IHC	304	V8	4	19,700	Bucket Truck	561	303	0.96	2257	2005	46
47	12-28-70	312	C. W. B.	1970	IHC	304	V8	4	19,700	Service	6816	272	1.02	2121	1836	47
48	12-28-70	314	C. W. B.	1970	IHC	304	V8	4	19,700	Service	3521	346	1.63	2080	1831	48
49	12-29-70	301	C. W. B.	1970	IHC	304	V8	4	10,000	Crew Truck	3099	265	0.99	2571	2261	49
50	12-29-70	302	C. W. B.	1970	IHC	304	V8	4	10,000	Crew Truck	4264	352	2.24	2067	1810	50

*Hi-lo means two-speed rear axle.

TABLE D-1 (Cont'd). VEHICLE DESCRIPTION AND FIRST ROUND EMISSION RESULTS
"0" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF JULY 6, 1971)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs.	Vehicle Type	Initial Mileage	Emission Results				Unit No.
												HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	
51	12-30-70	93	Pearl	1970	IHC	304	V8	3	7,500	Delivery	11,034	261	1.40	2322	2086	51
52	12-31-70	105	Pearl	1970	GMC	292	6	3	7,500	Delivery	15,944	253	0.86	3241	2803	52
53	12-31-70	106	Pearl	1970	Dodge	318	V8	3	7,500	Delivery	8,504	277	1.50	2050	1972	53
54	12-31-70	122	Pearl	1970	Ford	300	6	3	7,500	Delivery	18,143	186	0.26	3984	3957	54
55	1-2-71	311	C. W. B	1970	IHC	304	V8	4	19,700	Service	3,729	331	1.39	1805	1844	55
56	1-2-71	313	C. W. B	1970	IHC	304	V8	4	19,700	Service	4,938	280	1.27	1784	1612	56
57	1-2-71	315	C. W. B	1970	IHC	304	V8	4	19,700	Service	2,812	350	1.49	1959	2000	57
58	1-2-71	316	C. W. B.	1970	IHC	304	V8	4	19,700	Service	1,522	276	1.35	1968	1692	58
59	1-2-71	317	C. W. B.	1970	IHC	304	V8	4	19,700	Service	3,320	301	1.20	2035	1691	59
60	1-3-71	253	C. W. B	1970	Chevrolet	307	V8	4	7,500	Service	2,056	280	3.79	1102	1150	60
61	1-3-71	254	C. W. B	1970	Chevrolet	307	V8	4	7,500	Service	5,031	279	2.90	1184	1299	61
62	1-3-71	391	C. W. B.	1970	Chevrolet	366	V8	5	32,000	Crane	687	170	1.14	1282	1033	62
63	1-3-71	392	C. W. B.	1970	Chevrolet	366	V8	5	32,000	Crane	990	184	1.16	481	390	63
64	1-6-71	582	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	14,520	294	1.47	2519	2308	64
65	1-7-71	581	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	10,656	328	1.94	2489	2119	65
66	1-9-71	251	C. W. B.	1970	Dodge	318	V8	3 auto	7,500	Meter	6,025	247	1.70	1796	1579	66
67	1-9-71	252	C. W. B.	1970	Dodge	318	V8	3 auto	7,500	Service	4,981	298	1.64	1752	1589	67
68	1-9-71	360	C. W. B.	1970	Ford	361	V8	5	25,500	Dump	8,094	322	1.75	1958	1721	68
69	1-12-71	5133	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	32	274	2.36	1022	1061	69
70	1-12-71	5140	C. P. S. B	1970	IHC	392	V8	6 auto	25,500	Line	30	291	2.06	977	1033	70
71	1-12-71	5097	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	456	270	1.14	1772	1878	71
72	1-12-71	5106	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	464	295	1.10	1585	1671	72
73	1-13-71	5130	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	45	281	2.32	1195	1256	73
74	1-13-71	5135	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	287	289	2.17	1238	1270	74
75	1-16-71	M-78	State Hospl	1970	Dodge	225	6	4	7,500	Pickup	5,963	255	2.13	2176	1881	75
76	1-16-71	M-80	State Hospl	1970	Dodge	225	6	4	7,500	Pickup	1,791	211	2.03	2271	1910	76
77	1-16-71	M-98	State Hospl	1970	Dodge	225	6	4	7,500	Pickup	2,019	226	1.83	2452	2599	77
78	1-16-71	SH-680	State Hospl	1970	Ford	302	V8	3 auto	6,800	Van	1,442	164	1.07	1795	1803	78
79	1-16-71	SH-699	State Hospl	1970	GMC	401	V6	5	27,000	Bus	838	229	2.04	1760	1656	79
80	1-18-71	1029	Lone Star	1970	Chevrolet	307	V8	4	6,600	Delivery	26,622	172	2.30	2655	2384	80
81	1-20-71	134	Herder	1970	Ford	300	6	5	21,000	Freight	16,201	132	0.52	1765	1731	81
82	1-21-71	135	Herder	1970	Ford	300	6	5	21,000	Freight	11,190	180	0.83	2024	1870	82
83	1-21-71	239	Herder	1970	Ford	361	V8	5	22,000	Freight	10,511	232	1.18	1658	1540	83
84	1-21-71	240	Herder	1970	Ford	361	V8	5	22,000	Freight	13,920	282	1.40	2212	2093	84
85	1-21-71	250	C. W. B.	1970	Chevrolet	307	V8	2 auto	7,500	Service	18,225	292	3.16	1624	1632	85
86	1-23-71	L-41	State Hospl	1970	Dodge	225	6	3 auto	10,000	Laundry	2,568	181	1.67	1651	1512	86
87	1-23-71	M-77	State Hospl	1970	Dodge	225	6	3 auto	10,000	Grounds	1,985	185	1.76	2197	2259	87
88	1-23-71	M-87	State Hospl	1970	Dodge	225	6	3 auto	7,500	Service	4,875	207	1.57	2301	2192	88
89	1-23-71	M-90	State Hospl	1970	Dodge	225	6	3 auto	10,000	Maintenance	3,274	201	1.60	2097	2135	89
90	1-23-71	M-95	State Hospl	1970	Dodge	225	6	3 auto	10,000	Grounds	201	181	1.67	2147	2123	90
91	1-26-71	2179	City P&R	1970	IHC	345	V8	4	19,000	Water Truck	219	230	0.89	2180	1969	91
92	1-27-71	2120	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	2,948	209	1.20	2052	1736	92
93	1-27-71	27	B. M. W.	1970	Ford	360	V8	4	7,500	Repair	7,553	230	1.85	1946	1981	93
94	1-28-71	2073	City P&R	1970	Chevrolet	292	6	3 auto	14,000	Maintenance	1,770	173	0.89	2322	2284	94
95	1-28-71	2121	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	2,262	260	2.06	1419	1497	95
96	1-29-71	4T1	B. C. R. D.	1970	Ford	240	6	3	7,500	Maintenance	13,174	261	0.93	1853	1840	96
97	1-29-71	4T16	B. C. R. D.	1970	Ford	240	6	3	7,500	Welder	9,762	262	1.62	1900	1864	97
98	1-30-71	1T22	B. C. R. D.	1970	Ford	330	V8	5	21,000	Water Truck	15,424	253	0.71	3025	3188	98
99	1-30-71	2T9	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water Truck	12,301	277	1.05	2904	3061	99
100	1-30-71	2T12	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water Truck	9,339	322	1.11	2986	2452	100

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*Hi-lo means two-speed rear axle.

TABLE D-1 (Cont'd). VEHICLE DESCRIPTION AND FIRST ROUND EMISSION RESULTS
"0" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF JULY 6, 1971)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs.	Vehicle Type	Initial Mileage	Emission Results HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
101	1-30-71	4T23	B. C. R. D.	1970	Ford	330	V8	5	21,000	Water Truck	11,705	407	5.51	806	801	101
102	2-3-71	7	B. M. W.	1970	Ford	360	V8	4	6,100	Maintenance	12,879	234	2.00	1858	1669	102
103	2-3-71	34	Southern	1970	GMC	427	V8	5*	32,500	Moving	2,123	63	1.52	593	600	103
104	2-4-71	2085	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	10,178	158	2.02	2270	2201	104
105	2-4-71	2122	City P&R	1970	IHC	392	V8	5	25,500	Maintenance	1,911	229	1.10	2346	2276	105
106	2-5-71	2119	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	2,166	226	1.83	1640	1609	106
107	2-5-71	2123	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	2,829	218	1.85	2026	1724	107
108	2-8-71	2168	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	2,612	214	2.10	2183	1930	108
109	2-8-71	2169	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	641	255	1.87	1757	1553	109
110	2-9-71	2081	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	5,057	162	2.15	2172	1759	110
111	2-9-71	2082	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	6,746	183	1.61	2288	1853	111
112	2-10-71	2170	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	14,584	615	1.85	2325	1955	112
113	2-11-71	51346	C. P. S. B.	1971	IHC	392	V8	6 auto	24,000	Construction	51	175	4.24	423	378	113
114	2-12-71	51375	C. P. S. B.	1971	IHC	392	V8	6 auto	25,500	Construction	52	206	2.07	1429	1296	114
115	2-12-71	51383	C. P. S. B.	1971	IHC	392	V8	6 auto	25,500	Construction	37	271	2.23	1346	1221	115
116	2-16-71	4364	Elmore	1970	GMC	350	V8	4	14,000	Moving	15,082	223	3.62	1311	1302	116
117	2-18-71	16	Elmore	1970	GMC	350	V8	4	10,000	Moving	15,764	154	0.47	1839	1834	117
118	2-18-71	043247	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	14	263	2.59	1421	1405	118
119	2-19-71	043144	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	15	252	2.69	1241	1227	119
120	2-19-71	043327	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	11	221	2.17	1510	1370	120
121	2-20-71	98	Faca	1970	GMC	292	6	4	10,000	Delivery	5,091	231	1.27	2197	2237	121
122	2-20-71	101	Faca	1970	GMC	292	6	4	10,000	Delivery	6,001	254	2.27	2573	2112	122
123	2-20-71	102	Faca	1970	GMC	292	6	4	10,000	Delivery	6,488	175	1.40	1143	1131	123
124	2-21-71	105	Faca	1970	GMC	292	6	4	10,000	Delivery	2,938	170	1.04	1140	998	124
125	3-9-71	043221	P.O.D.	1970	Dodge	318	V8	3 auto	7,000	Delivery	333	282	2.23	1195	944	125
126	3-11-71	042519	P.O.D.	1970	Dodge	318	V8	3 auto	7,000	Delivery	1,692	226	1.84	1155	1102	126
127	4-24-71	1085	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	737	189	0.65	2354	2114	127
128	4-6-71	1086	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	52	270	0.54	3068	2424	128
129	4-7-71	1088	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	227	317	1.70	1410	1340	129
130	4-12-71	1353	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	322	235	2.50	834	756	130
131	4-22-71	1347	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	340	213	2.19	618	611	131
132	4-23-71	1355	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	321	249	1.93	1358	1168	132
133	4-23-71	1340	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	320	216	2.69	642	552	133
134	4-27-71	1348	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	312	165	1.62	662	665	134
135	4-27-71	1345	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	14	227	2.19	806	791	135
136	4-27-71	1349	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	306	289	2.68	1253	1258	136
137	4-28-71	1365	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	305	257	2.65	843	899	137
138	4-28-71	1346	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	299	283	2.47	1152	1218	138
139	4-28-71	1364	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	310	250	2.66	1031	1087	139
140	4-29-71	1363	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	314	310	2.46	1083	1025	140
141	[illegible]-24-71	1087	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	1,053	279	1.37	1971	1821	141
142	5-18-71	496	ABC	1971	IHC	478	V8	5	32,000	Rental	7,725	307	1.88	2146	2187	142
143	5-18-71	497	ABC	1971	IHC	478	V8	5	32,000	Rental	1,432	283	1.72	1520	1547	143
144	5-19-71	503	ABC	1971	IHC	478	V8	5	32,000	Rental	3,273	298	1.60	1784	1750	144
145	5-21-71	3	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	23	227	0.88	1093	1155	145
146	5-24-71	1	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	759	84	1.02	1248	1303	146
147	5-24-71	5	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	172	176	0.99	1043	1089	147
148	5-24-71	2	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	119	224	1.24	979	1022	148
149	6-11-71	7	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	1,441	308	1.03	1206	1240	149
150	6-11-71	4	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	1,504	307	1.71	1384	1423	150
151	6-14-71	276-15T	Southern	1971	Chevrolet	427	V8	5	32,500	Moving Co	3,554	238	1.32	1224	1290	151
152	6-18-71	6	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	2,121	362	1.25	1349	1432	152

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*Hi-lo means two-speed rear axle.

TABLE D-2. VEHICLE DESCRIPTION AND SECOND ROUND EMISSION RESULTS
"4" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF NOVEMBER 1, 1971)

Unit No	Date Tested	Truck No	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs.	Vehicle Type	Test Miles	Emission Results				Unit No.
														NO, ppm		
												HC, ppm	CO, %	Obs.	Corr	
1	3-8-71	P041001	P O D	1970	Dodge	318	V8	3 auto	10,000	Van	3,613	285	1.47	1655	1728	1
2	3-10-71	P040999	P O D.	1970	Dodge	318	V8	3 auto	10,000	Van	1,657	262	1.70	1875	1819	2
3	3-8-71	P040997	P O D.	1970	Dodge	318	V8	3 auto	10,000	Van	3,469	249	1.90	1095	1071	3
4	3-10-71	P041000	P O D	1970	Dodge	318	V8	3 auto	10,000	Van	3,366	277	2.15	1489	1444	4
5	3-9-71	P041002	P.O D	1970	Dodge	318	V8	3 auto	10,000	Van	2,192	207	1.40	948	881	5
6	4-5-71	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	6,250	174	0.94	2241	2079	6
7	4-5-71	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	6,317	220	3.81	1512	1473	7
8	4-6-71	351	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	6,203	215	2.24	1926	1812	8
9	4-6-71	350	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	6,292	249	2.14	1960	1885	9
10	4-7-71	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	6,352	207	2.60	1549	1458	10
11	3-25-71	24340	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	3,429	281	1.63	1313	1348	11
12	3-29-71	24341K	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	5,436	182	0.87	1966	1701	12
13	3-31-71	24343	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	4,465	251	1.82	1317	1246	13
14	5-26-71	24342	Ryder	1970	IHC	478	V8	5	32,000	Rental	4,261	239	1.53	1450	1495	14
15	4-2-71	56	N.S.S D	1970	IHC	345	V8	5	25,500	School Bus	10,968	280	1.05	2238	1958	15
16	4-1-71	53	N S.S D.	1970	IHC	345	V8	5	25,500	School Bus	10,063	274	1.21	2212	2146	16
17	4-1-71	55	N S.S D	1970	IHC	345	V8	5	25,500	School Bus	9,159	264	1.08	2469	2395	17
18	3-30-71	6	N S.S D	1970	IHC	345	V8	5	22,000	School Bus	4,874	272	1.13	2770	2620	18
19	3-31-71	54	N S.S D.	1970	IHC	345	V8	5	22,000	School Bus	2,422	190	1.61	2211	2663	19
20	3-26-71	72341	Hertz	1970	Ford	300	6	3 auto	10,000	Stake	2,794	151	1.04	1850	1726	20
21	3-26-71	72218	Hertz	1970	Ford	240	6	3 auto	7,500	Pickup	5,579	261	0.54	2241	2184	21
22	6-14-71	5131	C. P.S B	1971	IHC	392	V8	3 auto	25,500	Line	1,499	288	2.77	1137	1157	22
23	6-11-71	5132	C. P.S.B.	1970	IHC	392	V8	3 auto	25,500	Line	827	365	2.27	1642	1704	23
24	9-7-71	5136	C. P.S.B.	1971	IHC	392	V8	3 auto	25,500	Line	2,998	255	2.08	1493	1493	24
25	6-15-71	5141	C P.S B.	1971	IHC	392	V8	3 auto	25,500	Line	586	261	2.38	879	924	25
26	4-9-71	4952	C. P.S.B	1971	IHC	304	V8	4	14,000	Van	1,345	303	1.67	2233	2139	26
27	4-12-71	6615	C. P S.B	1970	Ford	300	6	4	10,000	Service	2,414	180	0.43	1541	1450	27
28	4-12-71	6616	C. P.S B	1970	Ford	300	6	4	10,000	Service	2,001	218	0.48	1719	1617	28
29	4-13-71	4824	C. P.S.B	1970	Ford	300	6	4	16,000	Service	4,647	262	0.63	3204	2948	29
30	4-9-71	4726	C P.S.B	1970	Chevrolet	292	6	4	9,000	Service	4,461	257	0.88	2499	2394	30
31	4-8-71	4728	C P.S.B.	1970	Chevrolet	250	6	4	7,500	Service	6,171	260	0.94	2661	2218	31
32	4-8-71	47290	C. P S.B	1970	Chevrolet	250	6	4	7,500	Service	1,976	284	1.26	2632	2445	32
33		671	Brown Exp	1971	Ford	300	6	5	24,000	Freight Van		Transferred to another city				33
34		672	Brown Exp	1971	Ford	300	6	5	24,000	Freight Van		Transferred to another city				34
35		673	Brown Exp	1971	Ford	300	6	5	24,000	Freight Van		Transferred to another city				35
36	4-8-71	4727	C. P S.B.	1970	Chevrolet	250	6	4	7,500	Service	1,569	285	1.45	2628	2299	36
37	4-8-71	4730	C P S B.	1970	Chevrolet	250	6	4	7,500	Service	3,346	294	0.97	2732	2391	37
38	4-9-71	4951	C. P.S B.	1970	IHC	304	V8	4	14,000	Service	6,756	325	1.13	2711	2608	38
39	4-19-71	8810	C P S.B.	1970	Ford	300	6	4	16,000	Service	4,587	189	0.60	1696	1703	39
40	4-15-71	8811	C P.S.B.	1970	Ford	300	6	4	16,000	Service	4,174	212	0.31	3347	3093	40
41	4-15-71	6855	C. P S.B.	1970	Ford	300	6	4	16,000	Service	7,078	194	0.48	2522	2330	41
42	4-14-71	6617	C. P S B	1970	Ford	300	6	4	10,000	Wrecker	656	189	0.45	1075	980	42
43	4-13-71	6856	C. P.S B	1970	Ford	300	6	4	16,000	Service	2,848	210	0.70	2572	2366	43
44	4-14-71	4671	C P.S B	1970	Ford	300	6	4	10,000	Stake	1,623	231	0.48	2501	2280	44
45	4-16-71	6857	C P.S B	1970	Ford	300	6	4	16,000	Service	3,863	241	0.58	2007	1993	45
46	4-10-71	4950	C P.S.B	1970	IHC	304	V8	4	19,700	Bucket Truck	7,639	260	1.07	1947	1857	46
47	5-17-71	312	C W B	1970	IHC	304	V8	4	19,700	Service	5,616	223	1.27	2155	2114	47
48	5-8-71	314	C W. B.	1970	IHC	304	V8	4	19,700	Service	2,038	280	1.55	2384	2384	48
49	5-20-71	301	C W. B.	1970	IHC	304	V8	4	10,000	Crew Truck	2,788	264	1.45	2319	2328	49
50	5-20-71	302	C W B	1970	IHC	304	V8	4	10,000	Crew Truck	2,636	247	2.60	1743	1749	50

*Hi-lo means two-speed rear axle.

TABLE D-2 (Cont'd). VEHICLE DESCRIPTION AND SECOND ROUND EMISSION RESULTS "4" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF NOVEMBER 1, 1971)

Unit No	Date Tested	Truck No	Source	Vehicle Year	Make	Engine CID	Cyl	Trans Speeds*	GVW lbs	Vehicle Type	Test Miles	HC, ppm	Emission Results CO, %	NO, ppm Obs	NO, ppm Corr	Unit No
51	4-15-71	93	Pearl	1970	IHC	304	V8	3	7,500	Delivery	2,815	290	1.46	1987	1973	51
52	4-13-71	105	Pearl	1970	GMC	292	6	3	7,500	Delivery	6,021	198	0.56	3136	3114	52
53	4-15-71	106	Pearl	1970	Dodge	318	V8	3	7,500	Delivery	2,667	341	1.56	1958	1876	53
54	4-12-71	122	Pearl	1970	Ford		6	3	7,500	Delivery	5,260	215	0.34	3488	3314	54
55	5-8-71	311	C. W. B.	1970	IHC	304	V8	4	19,700	Crew Truck	2,575	306	1.41	1917	1925	55
56	5-17-71	313	C. W. B.	1970	IHC	304	V8	4	19,700	Service	4,028	206	1.30	1257	1233	56
57	5-21-71	315	C. W. B.	1970	IHC	304	V8	4	19,700	Service	2,443	295	1.41	2517	2683	57
58	5-7-71	316	C. W. B.	1970	IHC	304	V8	4	19,700	Service	978	240	1.30	2332	2451	58
59	5-4-71	317	C. W. B.	1970	IHC	304	V8	4	19,700	Service	2,270	233	1.22	2067	2075	59
60	5-6-71	253	C. W. B.	1970	Chevrolet	307	V8	4	7,500	Service	1,311	245	3.39	1539	1617	60
61	5-6-71	254	C. W. B.	1970	Chevrolet	307	V8	4	7,500	Service	3,833	192	2.56	1199	1260	61
62	5-18-71	391	C. W. B.	1970	Chevrolet	366	V8	5	32,000	Crane	534	186	0.76	1084	1146	62
63	5-19-71	392	C. W. B.	1970	Chevrolet	366	V8	5	32,000	Crane	195	139	1.11	483	483	63
64	5-26-71	582	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	7,679	251	1.76	2071	2183	64
65	5-25-71	581	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	5,170	316	2.03	2457	2550	65
66	4-5-71	251	C. W. B.	1970	Dodge	318	V8	3 auto	7,500	Meter	2,489	236	1.92	1596	1677	66
67	4-5-71	252	C. W. B.	1970	Dodge	318	V8	3 auto	7,500	Service	2,216	235	1.97	1430	1503	67
68	5-18-71	360	C. W. B.	1970	Ford	361	V8	5	25,500	Dump	5,193	293	2.12	1651	1745	68
69	6-10-71	5133	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	856	304	1.92	1393	1446	69
70	6-10-71	5140	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	2,331	292	2.16	1346	1370	70
71	6-16-71	5097	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	4,596	269	1.01	2227	2227	71
72	6-15-71	5106	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	4,905	258	0.81	2270	2386	72
73	6-14-71	5130	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	2,619	375	3.02	1061	1080	73
74	6-10-71	5135	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	1,722	309	1.71	1629	1691	74
75	6-5-71	M-74	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	1,158	319	1.95	2117	2161	75
76	6-6-71	M-80	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	713	260	1.88	2221	2283	76
77	6-6-71	M-98	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	889	271	1.53	2404	2454	77
78	6-5-71	SH-680	State Hosp	1970	Ford	302	V8	3 auto	6,800	Van	1,808	236	1.03	2001	2009	78
79	6-5-71	SH-699	State Hosp	1970	GMC	401	V6	5	27,000	Bus	3,378	329	4.75	855	856	79
80	5-26-71	1029	Lone Star	1970	Chevrolet	307	V8	4	6,600	Delivery	10,511	284	2.96	2336	2504	80
81	5-27-71	134	Herder	1970	Ford	300	6	5	21,000	Freight	7,079	214	0.40	1623	1673	81
82	5-27-71	135	Herder	1970	Ford	300	6	5	21,000	Freight	4,736	150	0.65	2521	2599	82
83	6-1-71	239	Herder	1970	Ford	361	V8	5	22,000	Freight	4,690	331	1.41	1861	1956	83
84	6-1-71	240	Herder	1970	Ford	361	V8	5	22,000	Freight	9,320	377	1.93	2088	2194	84
85		250	C. W. B.	1970	Chevrolet	307	V8	2 auto	7,500	Service	Wrecked					85
86	6-6-71	L-41	State Hosp	1970	Dodge	225	6	3 auto	10,000	Laundry	1,007	244	1.88	2211	2273	86
87	6-5-71	M-77	State Hosp	1970	Dodge	225	6	3 auto	10,000	Grounds	910	237	1.73	2414	2424	87
88	6-6-71	M-87	State Hosp	1970	Dodge	225	6	3 auto	7,500	Service	2,337	280	1.61	2249	2312	88
89	6-6-71	M-90	State Hosp	1970	Dodge	225	6	3 auto	10,000	Maintenance	1,599	255	2.40	2479	2548	89
90	6-5-71	M-95	State Hosp	1970	Dodge	225	6	3 auto	10,000	Grounds	790	230	1.70	2367	2376	90
91	6-3-71	2179	City P&R	1970	IHC	345	V8	4	19,000	Water Truck	255	282	1.08	1897	1999	91
92	6-2-71	2120	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	2,104	280	1.73	1850	1850	92
93	6-7-71	27	B. M. W.	1970	Ford	360	V8	4	7,500	Repair	5,482	298	2.23	1680	1648	93
94	6-4-71	2073	City P&R	1970	Chevrolet	292	6	3 auto	14,000	Maintenance	940	208	0.84	2579	2579	94
95	6-4-71	2121	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	969	304	2.55	1451	1481	95
96	6-12-71	4T1	B.C.R.D.	1970	Ford	240	6	3	7,500	Maintenance	5,392	327	1.13	1703	1734	96
97	6-11-71	4T16	B.C.R.D.	1970	Ford	240	6	3	7,500	Welder	3,849	344	1.54	1865	1899	97
98	6-11-71	1T22	B.C.R.D.	1970	Ford	330	V8	5	21,000	Water Truck	8,182	300	0.52	3009	3063	98
99	6-8-71	2T9	B.C.R.D.	1970	Ford	330	V8	4	24,000	Water Truck	4,932	368	0.81	3331	3268	99
100	6-8-71	2T12	B.C.R.D.	1970	Ford	330	V8	4	21,000	Water Truck	3,572	349	0.91	2736	2686	100

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*Hi-lo means two-speed rear axle.

TABLE D-2 (Cont'd). VEHICLE DESCRIPTION AND SECOND ROUND EMISSION RESULTS
"4" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF NOVEMBER 1, 1971)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs	Vehicle Type	Test Miles	Emission Results HC, ppm	Emission Results CO, %	Emission Results NO, ppm Obs	Emission Results NO, ppm Corr.	Unit No.
101	6-11-71	4T23	B.C.R.D.	1970	Ford	330	V8	5	21,000	Water Truck	9,154	359	1.22	2734	2783	101
102	6-7-71	7	B.M.W.	1970	Ford	360	V8	4	7,500	Maintenance	4,821	292	2.19	2172	2131	102
103	6-16-71	34	Southern	1970	GMC	427	V8	5	32,500	Moving	32,371	236	2.18	1389	1389	103
104	6-4-71	2085	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	4,092	212	2.36	1847	1886	104
105	6-4-71	2122	City P&R	1970	IHC	392	V8	5	25,500	Maintenance	403	312	1.88	2173	2173	105
106	6-2-71	2119	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	958	274	2.29	1597	1567	106
107	6-3-71	2123	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	1,375	272	1.99	1922	2001	107
108	6-3-71	2168	City P&R	1970	Chevrolet	307	V8	4	14,000	Maintenance	1,190	241	2.55	1776	1776	108
109	6-3-71	2169	City P&R	1970	Chevrolet	307	V8	4	14,000	Maintenance	296	290	2.32	1653	1653	109
110	6-1-71	2081	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	2,196	256	2.88	1811	1903	110
111	6-1-71	2082	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	1,909	246	2.41	1797	1889	111
112	6-4-71	2170	City P&R	1970	Chevrolet	307	V8	4	14,000	Maintenance	4,297	237	2.42	2168	2168	112
113	6-11-71	51346	C.P.S.B.	1971	IHC	392	V8	6 auto	24,000	Construction	478	329	3.66	920	955	113
114	6-9-71	51375	C.P.S.B.	1971	IHC	392	V8	6 auto	25,500	Line	952	322	2.11	1282	1282	114
115	6-10-71	51383	C.P.S.B.	1970	IHC	392	V8	6 auto	25,500	Line	975	264	2.22	1332	1356	115
116	6-3-71	4364	Elmore	1970	GMC	350	V8	4	14,000	Moving	583	208	1.40	1807	1845	116
117	6-3-71	16	Elmore	1970	GMC	350	V8	4	10,000	Moving	1,040	197	0.65	1900	1959	117
118	6-9-71	043247	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	2,076	338	1.92	1804	1770	118
119	6-9-71	043144	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	3,016	321	2.08	1475	1446	119
120	6-9-71	043327	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Mail	1,885	315	1.59	1616	1585	120
121	6-20-71	98	Face	1970	GMC	292	6	4	10,000	Delivery	4,672	292	1.52	2194	2203	121
122	6-20-71	101	Face	1970	GMC	292	6	4	10,000	Delivery	5,392	317	1.99	2445	2496	122
123	6-20-71	102	Face	1970	GMC	292	6	4	10,000	Delivery	6,689	232	1.61	1221	1226	123
124	6-20-71	105	Face	1970	GMC	292	6	4	10,000	Delivery	3,386	270	1.04	2006	2048	124
125	6-8-71	043221	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Delivery	2,031	322	2.05	1252	1316	125
126	6-8-71	042519	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Delivery	2,085	275	1.98	1108	1172	126
127	8-7-71	1085	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	2,173	202	0.77	2467	2576	127
128	8-7-71	1086	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	3,798	235	1.09	2638	2693	128
129	8-21-71	1088	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	3,906	314	2.74	1947	1947	129
130	8-9-71	1353	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	4,768	253	2.07	1904	1952	130
131	8-9-71	1347	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	4,716	245	1.88	1393	1422	131
132	8-18-71	1355	C.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	3,324	187	3.29	1267	1290	132
133	8-10-71	1340	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	4,290	216	3.09	738	759	133
134	8-13-71	1348	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	3,348	229	6.56	434	429	134
135	9-9-71	1345	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	4,108	225	2.40	1251	1274	135
136	8-12-71	1349	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	2,447	290	2.83	1641	1730	136
137	9-21-71	1365	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	[illegible],070	288	2.94	1578	1567	137
138	8-20-71	1346	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	3,612	466	2.79	1980	2067	138
139	8-17-71	1364	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	2,815	284	2.25	1704	1692	139
140	8-20-71	1363	S.A.P.W.	1971	IHC	392	V8	6 auto	34,000	Garbage	3,366	258	2.10	2090	2105	140
141	8-21-71	1087	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	4,147	270	1.76	2094	2071	141
142	9-23-71	496	ABC	1971	IHC	478	V8	5	32,000	Rental	15,457	399	1.72	2289	2346	142
143	9-7-71	497	ABC	1971	IHC	478	V8	5	32,000	Rental	1,161	243	1.53	1312	1336	143
144	9-15-71	503	ABC	1971	IHC	478	V8	5	32,000	Rental	7,791	252	1.68	1766	1803	144
145	9-24-71	3	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	7,750	212	1.09	1511	1553	145
146	9-13-71	1	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	7,267	253	2.14	1435	1489	146
147	10-22-71	5	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	9,173	196	2.03	1130	1101	147
148	9-13-71	2	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	7,044	359	2.55	1094	1136	148
149	9-24-71	7	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	9,203	272	2.10	996	989	149
150	10-25-71	4	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	11,016	208	1.46	1287	1319	150
151	10-25-71	15T	Southern	1971	Chevrolet	427	V8	5	32,500	Moving Co.	14,620	242	2.59	927	921	151
152	10-22-71	6	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	10,383	420	1.84	1729	1677	152

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*Hi-lo means two-speed rear axle.

TABLE D-3. VEHICLE DESCRIPTION AND THIRD ROUND EMISSION RESULTS "8" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF FEBRUARY 1, 1972)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs	Vehicle Type	Test Miles	Emission Results HC, ppm	Emission Results CO, %	Emission Results NO, ppm Obs.	Emission Results NO, ppm Corr.	Unit No.
1	6-22-71	PO41001	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Van	6,565	378	1.58	1689	1753	1
2	6-21-71	PO40999	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Van	3,867	325	1.85	1470	1558	2
3	6-14-71	PO40997	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Van	6,305	326	1.77	1312	1362	3
4	6-21-71	PO41000	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Van	6,661	347	2.24	1508	1598	4
5	6-23-71	PO41002	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Van	4,047	269	1.39	805	799	5
6	8-20-71	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	12,906	306	1.67	2515	2543	6
7	8-18-71	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	12,217	194	3.57	1538	1544	7
8	8-19-71	351	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	12,599	235	2.73	2098	2098	8
9	8-19-71	350	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	12,636	140	2.57	1960	1960	9
10	8-18-71	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	12,250	151	4.23	717	720	10
11	7-25-71	24340	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	7,386	294	1.68	1325	1353	1
12	8-12-71	24341K	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	15,087	231	1.31	1838	1937	12
13	8-12-71	24343	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	9,946	259	2.78	1613	1700	13
14	8-12-71	24342	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	8,501	241	1.82	1404	1480	14
15	8-1-71	56	N.S.S.D.	1970	IHC	345	V8	5	25,500	School Bus	16,628	253	1.34	2116	2256	15
16	8-3-71	53	N.S.S.D.	1970	IHC	345	V8	5	25,500	School Bus	15,367	261	1.18	2338	2492	16
17	6-28-71	55	N.S.S.D.	1970	IHC	345	V8	5	25,500	School Bus	13,734	285	1.18	1939	2106	17
18	6-28-71	6	N.S.S.D.	1970	IHC	345	V8	5	22,000	School Bus	7,821	339	0.92	2461	2616	18
19	8-3-71	54	N.S.S.D.	1970	IHC	345	V8	5	22,000	School Bus	7,550	193	1.52	2348	2517	19
20	8-11-71	72341	Hertz	1970	Ford	300	6	3 auto	10,000	Stake	6,039	184	0.94	2010	1996	20
21	8-24-71	72218	Hertz	1970	Ford	240	6	3 auto	7,500	Pick-up	13,398	274	0.85	2258	2242	21
22	9-13-71	5131	C.P.S.B.	1971	IHC	392	V8	3 auto	25,500	Line	5,171	213	2.94	1103	1061	22
23	9-20-71	5132	C.P.S.B.	1970	IHC	392	V8	3 auto	25,500	Line	3,471	315	2.26	1871	1835	23
24	1-20-72	5136	C.P.S.B.	1971	IHC	392	V8	3 auto	25,500	Line	7,414	261	1.57	2230	1875	24
25	9-21-71	5141	C.P.S.B.	1971	IHC	392	V8	3 auto	25,500	Line	1,461	185	2.00	933	933	25
26	9-7-71	4952	C.P.S.B.	1971	IHC	304	V8	4	14,000	Van	6,364	225	0.86	2353	2353	26
27	8-23-71	6615	C.P.S.B.	1970	Ford	300	6	4	10,000	Service	4,300	120	0.56	1140	1168	27
28	8-30-71	6616	C.P.S.B.	1970	Ford	300	6	4	10,000	Service	5,550	173	0.45	2006	1954	28
29	8-26-71	4824	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	9,466	169	0.69	3180	3158	29
30	9-1-71	4726	C.P.S.B.	1970	Chevrolet	292	6	4	9,000	Service	10,885	212	0.93	2452	2435	30
31	9-2-71	4728	C.P.S.B.	1970	Chevrolet	250	6	4	7,500	Service	14,994	222	1.09	2483	2456	31
32	9-2-71	47290	C.P.S.B.	1970	Chevrolet	250	6	4	7,500	Service	5,450	239	1.55	2328	2302	32
33	12-10-70	671	Brown Exp	1971	Ford	300	6	5	24,000	Freight	Transferred to another city					33
34	12-10-70	672	Brown Exp	1971	Ford	300	6	5	24,000	Freight	" " " "					34
35	12-10-70	673	Brown Exp	1971	Ford	300	6	5	24,000	Freight	" " " "					35
36	9-2-71	4727	C.P.S.B.	1970	Chevrolet	250	6	4	7,500	Service	4,209	293	1.84	2295	2279	36
37	9-1-71	4730	C.P.S.B.	1970	Chevrolet	250	6	4	7,500	Service	8,123	284	1.41	2492	2475	37
38	8-27-71	4951	C.P.S.B.	1970	IHC	304	V8	4	14,000	Service	14,835	273	1.14	2423	2491	38
39	9-3-71	6810	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	10,152	251	3.52	1457	1457	39
40	8-25-71	8811	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	9,323	102	0.19	3243	3159	40
41	9-8-71	6855	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	13,452	158	0.47	1976	1925	41
42	8-23-71	6617	C.P.S.B.	1970	Ford	300	6	4	10,000	Wrecker	2,122	181	0.83	2382	2442	42
43	8-25-71	6856	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	6,698	184	0.50	3407	3342	43
44	9-3-71	4671	C.P.S.B.	1970	Ford	300	6	4	10,000	Stake	4,812	239	0.46	2355	2338	44
45	8-30-71	6857	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	9,041	160	0.76	2309	2249	45
46	8-26-71	4950	C.P.S.B.	1970	IHC	304	V8	4	19,700	Bucket Truck	15,597	198	1.75	2113	2098	46
47	10-10-71	312	C.W.B.	1970	IHC	304	V8	4	19,700	Service	12,041	219	0.88	2884	2509	47
48	9-25-71	314	C.W.B.	1970	IHC	304	V8	4	19,700	Service	4,589	267	1.47	2618	2599	48
49	10-19-71	301	C.W.B.	1970	IHC	304	V8	4	10,000	Crew Truck	6,795	232	1.50	2278	2303	49
50	10-19-71	302	C.W.B.	1970	IHC	304	V8	4	10,000	Crew Truck	5,855	225	2.14	1771	1790	50

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*Hi-Lo means two-speed rear axle.

TABLE D-3 (Cont'd). VEHICLE DESCRIPTION AND THIRD ROUND EMISSION RESULTS "8" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF FEBRUARY 1, 1972)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs	Vehicle Type	Test Miles	Emission Results HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
51	8-5-71	93	Pearl	1970	IHC	304	V8	3	7,500	Delivery	7,321	241	1.73	2236	2384	51
52	8-4-71	105	Pearl	1970	GMC	292	6	3	7,500	Delivery	12,412	219	0.85	3445	3672	52
53	8-5-71	106	Pearl	1970	Dodge	318	V8	3	7,500	Delivery	6,520	292	1.44	2200	2345	53
54	8-4-71	122	Pearl	1970	Ford	300	6	3	7,500	Delivery	12,276	218	0.47	3811	3879	54
55	9-25-71	311	C. W. B.	1970	IHC	304	V8	4	19,700	Service	4,406	243	1.36	2592	2665	55
56	9-25-71	313	C. W. B.	1970	IHC	304	V8	4	19,700	Service	7,311	249	1.31	2793	2843	56
57	10-9-71	315	C. W. B.	1970	IHC	304	V8	4	19,700	Service	4,611	270	1.58	2097	2204	57
58	9-25-71	316	C. W. B.	1970	IHC	304	V8	4	19,700	Service	3,024	199	1.14	1835	1886	58
59	10-9-71	317	C. W. B.	1970	IHC	304	V8	4	19,700	Service	5,090	247	1.17	2598	2730	59
60	10-3-71	253	C. W. B.	1970	Chevrolet	307	V8	4	7,500	Service	2,547	185	3.03	1821	1828	60
61	10-3-71	254	C. W. B.	1970	Chevrolet	307	V8	4	7,500	Service	8,677	323	3.10	1737	1744	61
62	10-10-71	391	C. W. B.	1970	Chevrolet	366	V8	5	32,000	Crane	1,440	115	1.18	1121	985	62
63	10-9-71	392	C. W. B.	1970	Chevrolet	366	V8	5	32,000	Crane	991	137	1.81	775	784	63
64	9-21-71	582	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	13,312	275	1.67	2270	2227	64
65	9-21-71	581	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	9,817	298	1.91	2632	2521	65
66	10-3-71	251	C. W. B.	1970	Dodge	318	V8	3 auto	7,500	Meter	6,457	229	1.85	1644	1626	66
67	10-3-71	252	C. W. B.	1970	Dodge	318	V8	3 auto	7,500	Service	4,979	221	1.73	1522	1511	67
68	10-16-71	360	C. W. B.	1970	Ford	361	V8	5	25,500	Dump	11,070	305	2.38	1786	1859	68
69	9-13-71	5133	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	3,046	213	1.66	1403	1350	69
70	9-9-71	5140	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	7,902	243	1.51	1625	1583	70
71	9-9-71	5097	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	7,163	258	1.41	2109	2066	71
72	9-22-71	5106	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	7,439	199	1.07	2252	2209	72
73	9-8-71	5130	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	7,267	287	2.66	1322	1288	73
74	9-21-71	5135	C. P. S. B.	1970	IHC	392	V8	6 auto	25,500	Line	4,059	274	2.49	2008	2008	74
75	10-16-71	M-78	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	2,927	245	2.19	2337	2321	75
76	10-16-71	M-80	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	1,445	218	2.08	2021	2029	76
77	10-16-71	M-98	State Hosp	1970	Dodge	225	6	4	7,500	Pickup	1,903	235	1.84	2493	2578	77
78	10-23-71	SH-680	State Hosp	1970	Ford	302	V8	3 auto	6,800	Van	2,982	214	1.67	1956	1956	78
79	10-23-71	SH-699	State Hosp	1970	GMC	401	V8	5	27,000	Bus	6,458	312	5.07	899	899	79
80	10-21-71	1029	Lone Star	1970	Chevrolet	307	V8	4	6,600	Delivery	23,078	289	2.89	1642	1532	80
81	9-23-71	134	Herder	1970	Ford	300	6	5	21,000	Freight	14,432	210	4.55	1291	1335	81
82	9-23-71	135	Herder	1970	Ford	300	6	5	21,000	Freight	9,212	151	0.95	1539	1591	82
83	9-28-71	239	Herder	1970	Ford	361	V8	5	22,000	Freight	8,080	312	1.54	1929	1915	83
84	9-27-71	240	Herder	1970	Ford	361	V8	5	22,000	Freight	14,979	311	2.41	1903	1890	84
85	1-12-71	250	C. W. B.	1970	Chevrolet	307	V8	2 auto	7,500	Service	This truck was wrecked May 25, 1971					85
86	10-17-71	L-41	State Hosp	1970	Dodge	225	6	3 auto	10,000	Laundry	2,198	199	1.96	1912	1946	86
87	10-16-71	M-77	State Hosp	1970	Dodge	225	6	3 auto	10,000	Grounds	2,330	182	1.91	2441	2509	87
88	10-17-71	M-87	State Hosp	1970	Dodge	225	6	3 auto	7,500	Service	4,652	184	1.61	2341	2383	88
89	10-24-71	SH-M90	State Hosp	1970	Dodge	225	6	3 auto	10,000	Maintenance	3,500	194	1.94	2755	2628	89
90	10-16-71	SH-M95	State Hosp	1970	Dodge	225	6	3 auto	10,000	Grounds	1,918	185	1.60	2309	2373	90
91	10-4-71	2179	City P&R	1970	IHC	345	V8	4	19,000	Water Truck	916	256	0.99	2192	2216	91
92	10-13-71	2120	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	4,197	227	1.76	1913	1934	92
93	9-22-71	27	B. M. W.	1970	Ford	360	V8	4	7,500	Repair	9,695	163	2.50	1712	1679	93
94	10-12-71	2073	City P&R	1970	Chevrolet	292	6	3 auto	14,000	Maintenance	1,672	170	0.84	2719	2730	94
95	10-12-71	2121	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	1,715	258	2.37	1521	1504	95
96	10-30-71	4T-1	B. C. R. D.	1970	Ford	240	6	3	7,500	Maintenance	10,882	289	2.70	1181	1136	96
97	10-30-71	4T-16	B. C. R. D.	1970	Ford	240	6	3	7,500	Welder	8,498	281	3.41	1106	1110	97
98	10-29-71	1T22	B. C. R. D.	1970	Ford	330	V8	5	21,000	Water Truck	16,738	278	0.83	2952	2964	98
99	11-17-71	2T9	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water Truck	11,214	298	0.88	2973	3006	99
100	11-17-71	2T12	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water Truck	10,961	406	1.30	2518	2545	100

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*Hi-Lo means two-speed rear axle.

TABLE D-3 (Cont'd). VEHICLE DESCRIPTION AND THIRD ROUND EMISSION RESULTS "8" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF FEBRUARY 1, 1972)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds*	GVW lbs	Vehicle Type	Test Miles	Emission Results				Unit No.
														NO, ppm		
												HC, ppm	CO, %	Obs.	Corr.	
101	10-29-71	4T23	B. C. R. D.	1970	Ford	330	V8	5	21,000	Water Truck	18,295	367	3.05	1883	1827	101
102	10-14-71	7	B. M. W.	1970	Ford	360	V8	4	6,100	Maintenance	10,289	274	2.33	1867	1818	102
103	10-25-71	34	Southern	1970	GMC	427	V8	5	32,500	Moving	26,526	245	3.68	627	625	103
104	10-13-71	2085	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	7,815	204	2.15	1694	1712	104
105	10-4-71	2122	City P&R	1970	IHC	392	V8	5	25,500	Maintenance	1,864	247	1.38	2117	2140	105
106	10-3-71	2119	City P&R	1970	Ford	360	V8	4	8,300	Maintenance	2,844	232	2.25	1794	1780	106
107	10-2-71	2123	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	3,026	210	1.97	1799	1849	107
108	10-5-71	2168	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	3,882	212	2.79	1815	1889	108
109	10-5-71	2169	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	393	247	2.47	1775	1912	109
110	10-11-71	2081	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	3,970	426	2.30	2425	2333	110
111	9-30-71	2082	City P&R	1970	Chevrolet	307	V8	3	7,500	Maintenance	3,937	228	2.59	1889	1923	111
112	10-15-71	2170	City P&R	1970	Chevrolet	307	V8	4	10,000	Maintenance	9,848	207	2.32	2064	2064	112
113	10-18-71	5134	C. P. S. B.	1971	IHC	392	V8	6 auto	24,000	Construction	3,021	340	4.06	869	862	113
114	10-26-71	51375	C. P. S. B.	1971	IHC	392	V8	6 auto	25,500	Construction	6,848	210	1.63	1587	1615	114
115	10-18-71	51383	C. P. S. B.	1971	IHC	392	V8	6 auto	25,500	Construction	6,785	262	2.05	1644	1690	115
116	10-21-71	4364(17)	Elmore	1970	GMC	350	V8	4	14,000	Moving	2,497	215	1.83	2080	1914	116
117	10-22-71	16	Elmore	1970	GMC	350	V8	4	10,000	Moving	3,546	139	1.07	1896	1816	117
118	11-24-71	043247	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Mail	5,687	257	1.67	1871	1637	118
119	11-24-71	043144	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Mail	7,411	295	1.99	1620	1417	119
120	11-26-71	043327	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Mail	4,275	269	1.58	1753	1492	120
121	10-23-71	98	Face	1970	GMC	292	6	4	10,000	Delivery	9,932	181	0.80	2528	2462	121
122	10-23-71	101	Face	1970	GMC	292	6	4	10,000	Delivery	10,802	194	1.91	2357	2218	122
123	10-24-71	102	Face	1970	GMC	292	6	4	10,000	Delivery	13,498	95	1.40	1280	1226	123
124	10-24-71	105	Face	1970	GMC	292	6	4	10,000	Delivery	6,574	173	0.63	2502	2354	124
125	12-14-71	043221	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Delivery	6,497	326	2.14	2112	1734	125
126	11-26-71	042519	P. O. D.	1970	Dodge	318	V8	3 auto	10,000	Delivery	4,872	296	1.70	1745	1485	126
127	12-04-71	1085	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	4,641	190	0.72	2655	2206	127
128	12-04-71	1086	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	8,148	213	0.87	2621	2204	128
129	12-05-71	1088	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	7,710	316	2.41	1954	1680	129
130	12-7-71	1353	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	9,573	266	2.60	1742	1749	130
131	12-9-71	1347	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	8,889	302	1.73	2233	2045	131
132	12-13-71	1355	C. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	6,699	491	11.92	272	266	132
133	12-13-71	1340	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	9,542	539	3.67	939	900	133
134	12-7-71	1348	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	6,978	214	2.16	1609	1560	134
135	12-9-71	1345	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	7,796	299	2.17	2147	2332	135
136	12-7-71	1349	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	5,306	302	2.77	1923	1903	136
137	12-8-71	1365	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	7,115	377	3.00	1524	1638	137
138	12-10-71	1346	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	7,175	338	2.49	2021	1669	138
139	12-13-71	1364	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	5,665	301	1.77	1659	1677	139
140	12-10-71	1363	S. A. P. W.	1971	IHC	392	V8	6 auto	34,000	Garbage	6,296	275	2.91	1679	1403	140
141	12-5-71	1087	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	7,647	292	1.99	1995	1716	141
142	1-10-72	496	ABC	1971	IHC	478	V8	5	32,000	Tractor	23,990	506	1.57	2414	2202	142
143	1-7-72	497	ABC	1971	IHC	478	V8	5	32,000	Rental	11,055	252	1.40	1895	1516	143
144	1-5-72	503	ABC	1971	IHC	478	V8	5	32,000	Rental	16,893	233	1.28	1803	1498	144
145	1-24-72	3	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	14,684	193	1.18	1502	1529	145
146	1-14-72	1	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	15,159	280	1.35	1829	1425	146
147	1-14-72	5	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	14,165	167	1.46	1495	1407	147
148	1-24-82	2	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	15,741	260	2.49	1212	1234	148
149	1-24-72	7	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	17,307	364	2.39	1010	884	149
150	1-24-72	4	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	15,475	307	1.62	1594	1564	150
151	1-19-72	15T	Southern	1971	Chevrolet	427	V8	5	32,500	Moving Co.	16,234	1838	2.07	763	749	151
152	1-24-72	6	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	11,786	216	1.06	1566	1599	152

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*Hi-Lo means two-speed rear axle.

TABLE D-4. VEHICLE DESCRIPTION AND FOURTH ROUND EMISSION RESULTS
12 MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF JULY 1, 1972)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl	Trans Speeds *	GVW lbs.	Vehicle Type	Test Miles	HC, ppm	Emission Results CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
1	1-25-72	PO04100.	U.S.P.O.	1970	Dodge	318	V-8	3 Auto	10,000	Van	11,560	322	1.45	2090	1693	1
2	1-25-72	040[illegible]	P.O.D.	1970	Dodge	318	V-8	3 Auto	10,000	Van	9,659	252	1.51	2019	1648	2
3	1-26-72	PO[illegible]	P.O.D.	1970	Dodge	318	V-8	3 Auto	10,000	Van	12,171	247	1.80	1418	1444	3
4	1-26-72	PO41[illegible]	P.O.D.	1970	Dodge	318	V-8	3 Auto	10,000	Van	12,628	350	2.21	1481	1497	4
5	1-27-72	PO41[illegible]	P.O.D.	1970	Dodge	318	V-8	3 Auto	7,000	Van	7,102	223	1.56	946	918	5
6	1-31-72	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	20,442	235	1.44	2363	1926	6
7	2-2-72	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	19,861	142	3.35	1484	1140	7
8	1-28-72	351	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	19,073	192	2.59	1553	1359	8
9	1-31-72	350	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	20,154	311	2.81	1988	1710	9
10	2-2-72	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	20,233	129	3.00	1860	1469	10
11	1-18-72	24340	Ryder	1970	IHC	478	V-8	5 Hi-Lo	32,000	Tractor	19,632	317	1.87	1444	1444	11
12	1-20-72	24341R	Ryder	1970	IHC	478	V-8	5 Hi-Lo	32,000	Tractor	22,433	635	0.80	1450	1183	12
13	2-17-72	24343	Ryder	1970	IHC	478	V-8	5 Hi-Lo	32,000	Tractor	21,396	362	1.11	1755	1329	13
14	2-14-72	24342	Ryder	1970	IHC	478	V-8	5 Hi-Lo	32,000	Tractor	18,769	377	1.97	1351	1278	14
15	2-29-72	56	N.S.S.D.	1970	IHC	345	V-8	5	25,500	SchoolBus	32,684	273	1.41	1829	1816	15
16	2-3-72	53	N.S.S.D.	1970	IHC	345	V-8	5	25,500	SchoolBus	28,855	243	1.33	2481	1824	16
17	2-3-72	55	N.S.S.D.	1970	IHC	345	V-8	5	25,500	SchoolBus	28,088	194	1.12	2289	1648	17
18	2-4-72	6	N.S.S.D.	1970	IHC	345	V-8	5	22,000	SchoolBus	14,017	271	1.32	2862	2229	18
19	2-8-72	54	N.S.S.D.	1970	IHC	345	V-8	5	22,000	SchoolBus	2,029	231	1.48	2381	1979	19
20	2-14-72	72341	Hertz	1970	Ford	300	6	3 Auto	10,000	Stake	9,808	202	1.09	1766	1671	20
21	Transferred															21
22	2-7-72	5131	CPSB	1971	IHC	392	V-8	3 Auto	25,500	Line	9,139	215	2.63	1451	1114	22
23	2-8-72	5132	CPSB	1970	IHC	392	V-8	3 Auto	25,500	Line	7,710	201	1.65	1873	1528	23
24	3-2-72	5136	CPSB	1971	IHC	392	V-8	3 Auto	25,500	Line	10,673	266	1.93	1367	1357	24
25	2-15-72	5141	CPSB	1971	IHC	392	V-8	3 Auto	25,500	Line	2,199	177	2.30	869	752	25
26	2-15-72	4952	CPSB	1971	IHC	304	V-8	4	14,000	Van	12,177	252	.86	2869	2513	26
27	2-11-72	6615	CPSB	1970	Ford	300	6	4	10,000	Service	8,327	169	0.46	2340	2036	27
28	2-16-72	6616	CPSB	1970	Ford	300	6	4	10,000	Service	9,897	185	0.50	1537	1262	28
29	2-10-72	4824	CPSB	1970	Ford	300	6	4	16,000	Service	15,189	171	0.56	3187	3066	29
30	2-10-72	4726	CPSB	1970	Chev	292	6	4	9,000	Service	18,393	225	1.19	2635	2524	30
31	2-9-72	4728	CPSB	1970	Chev	250	6	4	7,500	Service	23,720	255	1.39	2691	2096	31
32	2-9-72	4729	CPSB	1970	Chev	250	6	4	7,500	Service	10,176	223	1.03	2582	2133	32
33	Transferred to another city															33
34	Transferred to another city															34
35	Transferred to another city															35
36	2-17-72	4727	CPSB	1970	Chev	250	6	4	7,500	Service	8,985	252	1.80	2026	1653	36
37	2-18-72	4730	CPSB	1970	Chev	250	6	4	7,500	Service	11,321	272	0.68	3134	2698	37
38	2-18-72	4951	CPSB	1970	IHC	304	V-8	4	14,000	Service	24,981	236	0.94	2626	2182	38
39	2-21-72	4810	CPSB	1970	Ford	300	6	4	16,000	Service	16,873	213	4.78	1364	1284	39
40	2-21-72	6811	CPSB	1970	Ford	300	6	4	16,000	Service	16,165	120	0.15	3043	2927	40
41	2-22-72	6655	CPSB	1970	Ford	300	6	4	16,000	Service	19,156	156	0.45	1880	1809	41
42	2-[illegible]-72	6617	CPSB	1970	Ford	300	6	4	10,000	Wrecker	3,932	[illegible]	0.57	2994	2395	42
43	2-22-72	6856	CPSB	1970	Ford	300	6	4	16,000	Service	12,986	195	0.44	3121	3087	43
44	2-24-72	4671	CPSB	1970	Ford	300	6	4	10,000	Stake	8,388	272	0.61	3051	3051	44
45	2-23-72	6857	CPSB	1970	Ford	300	6	4	16,000	Service	16,194	194	0.50	1987	2025	45
46	2-23-72	4950	CPSB	1970	IHC	304	V-8	4	19,700	Bucket Tr.	26,608	256	1.71	1650	1581	46
47	3-5-72	312	CWB	1970	IHC	304	V-8	4	19,700	Service	18,271	242	0.94	2950	2510	47
48	2-26-72	314	CWB	1970	IHC	304	V-8	4	19,700	Service	7,668	226	1.33	2432	2160	48
49	3-11-72	301	CWB	1970	IHC	304	V-8	4	10,000	Crew Tr.	11,197	235	1.32	2767	2582	49
50	3-11-72	302	CWB	1970	IHC	304	V-8	4	10,000	Crew Tr.	8,858	234	2.24	1735	1726	50

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*Hi-Lo means two-speed rear axle.

TABLE D-4 (Cont'd). VEHICLE DESCRIPTION AND FOURTH ROUND EMISSION RESULTS
"12" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF JULY 1, 1972)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds *	GVW lbs.	Vehicle Type	Test Miles	HC, ppm	Emission Results CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
51	3-1-72	93	Pearl	1970	IHC	304	V-8	3	7,500	Delivery	13,680	324	1.82	1881	1794	51
52	3-30-72	105	Pearl	1970	GMC	292	6	3	7,500	Delivery	25,094	291	0.79	3663	2853	52
53	3-1-72	106	Pearl	1970	Dodge	318	V-8	3	7,500	Delivery	13,798	287	1.60	1844	1744	53
54	3-30-72	122	Pearl	1970	Ford	300	6	3	7,500	Delivery	24,069	183	0.26	4008	3167	54
55	2-26-72	311	CWB	1970	IHC	304	V-8	4	19,700	Service	6,689	267	1.34	2749	2444	55
56	3-5-72	313	CWB	1970	IHC	304	V-6	4	19,700	Service	11,146	225	1.22	2708	2223	56
57	2-27-72	315	CWB	1970	IHC	304	V-8	4	19,700	Service	7,989	243	1.46	2482	2204	57
58	3-4-72-	316	CWB	1970	IHC	304	V-8	4	19,700	Service	4,486	165	1.15	1492	1482	58
59	3-4-72	317	CWB	1970	IHC	304	V-8	4	19,700	Service	7,469	244	1.09	2537	2387	59
60	2-27-72	253	CWB	1970	Chev	307	V-8	4	7,500	Service	4,889	161	3.08	1600	1472	60
61	2-27-72	254	CWB	1970	Chev	307	V-8	4	7,500	Service	12,842	192	3.24	1648	1480	61
62	3-11-72	391	CWB	1970	Chev	366	V-8	5	32,000	Crane	3,203	182	0.75	941	878	62
63	3-18-72	392	CWB	1970	Chev	366	V-8	5	32,000	Crane	1,896	121	1.66	439	376	63
64	3-1-72	582	RedArrow	1970	Dodge	318	V-6	4	24,000	Freight	22,211	259	1.68	1641	1682	64
65	2-29-72	581	RedArrow	1970	Dodge	318	V-8	4	24,000	Freight	16,016	355	2.06	2112	2072	65
66	3-18-72	251	CWB	1970	Dodge	318	V-8	3	7,500	Meter	10,821	212	1.97	1440	1218	66
67	3-18-72	252	CWB	1970	Dodge	318	V-8	3	7,500	Service	8,275	262	1.74	2408	1880	67
68	3-29-72	360	CWB	1970	Ford	361	V-8	5	25,500	Dump	15,700	282	1.55	1965	1653	68
69	3-1-72	5133	CPSB	1970	IHC	392	V-8	6	25,500	Line	8,978	245	2.28	1253	1054	69
70	3-1-72	5140	CPSB	1970	IHC	392	V-8	6	25,500	Line	18,022	218	1.86	1477	1167	70
71	3-2-72	5097	CPSB	1971	IHC	345	V-8	5	25,000	Digger	12,555	302	1.52	2602	2095	71
72	3-2-72	5106	CPSB	1971	IHC	345	V-8	5	25,000	Digger	12,994	186	0.91	2787	2274	72
73	3-23-72	5130	CPSB	1970	IHC	392	V-8	6 Auto	25,500	Line	14,981	328	2.98	937	927	73
74	3-8-72	5135	CPSB	1970	IHC	392	V-8	6 Auto	25,500	Line	10,645	322	2.42	1632	1404	74
75	4-29-72	M-78	St. Hosp.	1970	Dodge	225	6	4	7,500	Pickup	5,321	229	2.10	2231	2271	75
76	4-29-72	M-80	St. Hosp.	1970	Dodge	225	6	4	7,500	Pickup	2,455	300	2.14	1454	1460	76
77	4-29-72	M-98	St. Hosp.	1970	Dodge	225	6	4	7,500	Pickup	3,046	285	1.44	2332	2374	77
78	4-6-72	SH680	St.Hosp	1970	Ford	302	V-8	3 Auto	6,800	Van	8,664	235	0.97	2469	2262	78
79	4-8-72	SH699	St.Hosp	1970	GMC	401	V-6	5	27,000	Bus	9,526	298	4.90	904	795	79
80	4-5-72	1029	LoneStar	1970	Chev	307	V-8	4	5,600	Delivery	34,837	259	2.27	1071	1071	80
81	3-22-72	134	Herder	1970	Ford	300	6	5	21,000	Freight	24,153	162	3.29	1256	1150	81
82	3-23-72	135	Herder	1970	Ford	300	6	5	21,000	Freight	15,848	269	0.51	3159	3172	82
83	3-22-72	239	Herder	1970	Ford	361	V-8	5	22,000	Freight	14,450	329	1.57	1120	1054	83
84	3-21-72	240	Herder	1970	Ford	361	V-8	5	22,000	Freight	21,901	586	2.48	2364	2090	84
85	Wrecked															85
86	4-8-72	L-41	St.Hosp	1970	Dodge	225	6	3 Auto	10,000	Laundry	3,597	207	2.14	2083	1823	86
87	4-9-72	M-77	St.Hosp	1970	Dodge	225	6	3 Auto	10,000	Grounds	3,468	230	2.06	2334	2208	87
88	4-9-72	M-87	St.Hosp	1970	Dodge	225	6	3 Auto	7,500	Service	7,691	175	1.90	1933	1903	88
89	4-9-72	M-9	St.Hosp.	1970	Dodge	225	6	3 Auto	10,000	Maint.	5,491	213	2.17	2565	2447	89
90	4-20-72	M-95	St. Hosp.	1970	Dodge	225	6	3 Auto	10,000	Grounds	3,066	268	1.71	1868	1888	90
91	3-15-72	2179	CPR	1970	IHC	345	V-8	4	19,000	WaterTr.	1,542	280	1.17	2198	2198	91
92	3-28-72	2120	CPR	1970	Ford	360	V-8	4	8,300	Maint.	6,608	237	1.55	1711	1447	92
93	3-29-72	27	BMW	1970	Ford	360	V-8	4	7,500	Repair	16,338	243	2.56	1630	1371	93
94	3-25-72	2073	CPR	1970	Chev	292	6	3 Auto	14,000	Maint.	3,283	179	0.84	2683	2385	94
95	3-25-72	2121	CPR	1970	Ford	360	V-8	4	8,300	Maint.	2,796	255	2.20	1537	1394	95
96	3-31-72	4T1	BCRD	1970	Ford	240	6	3	7,500	Maint.	17,218	211	1.32	1088	870	96
97	3-31-72	4T-16	BCRD	1970	Ford	240	6	3	7,500	Welder	10,932	288	1.87	2165	1732	97
98	4-4-72	1T22	BCRD	1970	Ford	330	V-8	5	21,000	WaterTr.	20,390	253	0.73	1807	1773	98
99	4-3-72	2T9	BCRD	1970	Ford	330	V-8	4	21,000	WaterTr.	66,227	2093	0.81	2760	2727	99
100	4-3-72	2T12	BCRD	1970	Ford	330	V-8	4	21,000	WaterTr.	13,743	416	1.40	2049	2010	100

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* Hi-lo means two-speed rear axle.

TABLE D-4 (Cont'd). VEHICLE DESCRIPTION AND FOURTH ROUND EMISSION RESULTS
"12" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF JULY 1, 1972)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans Speeds *	GVW lbs.	Vehicle Type	Test Miles	HC, ppm	Emission Results CO. %	Emission Results No. ppm Obs.	Emission Results No. ppm Corr.	Unit No.
101	3-31-72	4T-23	BCRD	1970	Ford	330	V-8	5	21,000	WaterTr.	20,454	480	3.89	1553	1267	101
102	4-5-72	7	BMW	1970	Ford	360	V-8	4	6,100	Maint.	18,126	272	2.90	1562	1551	102
103	4-6-72	34	Southern	1970	GMC	427	V-8	5	32,500	Moving	46,976	231	2.85	591	591	103
104	3-28-72	2065	CPR	1970	Chev	307	V-8	3	7,500	Maint.	12,227	174	2.22	2328	1969	104
105	3-9-72	2122	CPR	1970	IHC	392	V-8	5	25,500	Maint.	2,880	273	1.86	2143	1864	105
106	3-9-72	2119	CPR	1970	Ford	360	V-8	4	8,300	Maint.	3,756	250	1.97	1853	1629	106
107	3-25-72	2123	CPR	1970	Chev	307	V-8	3	7,500	Maint.	5,421	208	1.94	1516	1333	107
108	3-14-72	2168	CPR	1970	Chev	307	V-8	4	10,000	Maint.	7,267	206	2.96	1714	1709	108
109	3-14-72	2169	CPR	1970	Chev	307	V-8	4	10,000	Maint.	868	244	2.46	1519	1461	109
110	3-16-72	2081	CPR	1970	Chev	307	V-8	3	7,500	Maint.	6,334	244	2.49	1984	1708	110
111	3-16-72	2082	CPR	1970	Chev	307	V-8	3	7,500	Maint.	6,337	170	2.32	1955	1644	111
112	3-15-72	2170	CPR	1970	Chev	307	V-8	4	10,000	Maint.	15,142	208	2.54	1965	1928	112
113	4-4-72	5134	CPSB	1970	IHC	392	V-8	6 Auto	24,000	Constr.	5,377	232	2.99	717	720	113
114	4-6-72	51375	CPSB	1971	IHC	392	V-8	6 Auto	25,500	Constr.	12,504	211	1.95	1016	1016	114
115	4-12-72	5138	CPSB	1970	IHC	392	V-8	6 Auto	25,500	Constr.	24,048	316	3.02	974	1011	115
116	4-12-72	4364	Elmore	1970	GMC	350	V-8	4	14,000	Moving	4,481	211	2.30	1437	1421	116
117	6-7-72	15	Elmore	1970	GMC	350	V-8	4	10,000	Moving	7,600	181	1.33	1559	1613	117
118	4-13-72	043247	POD	1970	Dodge	316	V-8	3 Auto	10,000	Mail	8,135	316	1.94	1766	1747	118
119	4-17-72	043144	POD	1970	Dodge	318	V-8	3 Auto	10,000	Mail	11,447	345	2.02	1359	1094	119
120	4-18-72	043327	POD	1970	Dodge	318	V-8	3 Auto	10,000	Mail	7,045	270	1.71	1371	1356	120
121	5-6-72	98	FACS	1970	GMC	292	6	4	10,000	Delivery	18,349	208	.51	368	3696	121
122	5-7-72	101	FACS	1970	GMC	292	6	4	10,000	Delivery	18,550	224	1.96	2744	2793	122
123	5-21-72	102	FACS	1970	GMC	292	6	4	10,000	Delivery	24,888	150	1.67	1064	1001	123
124	5-7-72	105	FACS	1970	GMC	292	6	4	10,000	Delivery	11,917	125	0.75	1129	1190	124
125	5-9-72	043221	POD	1970	Dodge	318	V-8	3 Auto	10,000	Delivery	9,582	352	2.23	1358	1363	125
126	5-12-72	042519	POD	1970	Dodge	318	V-8	3 Auto	10,000	Delivery	6,945	261	1.89	1257	1283	126
127	5-21-72	1085	Lone Star	1971	Ford	391	V-8	5	27,500	Delivery	8,412	225	0.944	2294	2269	127
128	5-21-72	1086	Lone Star	1971	Ford	391	V-8	5	27,500	Delivery	14,574	224	0.74	2302	2259	128
129	5-21-72	1088	Lone Star	1971	Ford	391	V-8	5	27,500	Delivery	14,034	340	2.67	1694	1700	129
130	Converted to Butane Fuel															130
131	4-26-72	1347	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	12,173	205	1.74	1233	1296	131
132	4-24-72	1355	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	10,579	265	2.48	1561	1443	132
133	Converted to Butane Fuel															133
134	4-20-72	1348	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	10,731	223	2.03	1527	1554	134
135	4-19-72	1345	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	11,691	270	2.29	1791	1865	135
136	4-24-72	1349	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	8,222	279	2.52	1762	1629	136
137	4-25-72	1365	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	11,234	321	2.68	1798	1662	137
138	4-27-72	1346	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	11,450	483	3.96	1217	1203	138
139	4-26-72	1364	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	9,315	274	1.88	1326	1326	139
140	4-20-72	1363	SAPW	1971	IHC	392	V-8	6-Auto	34,000	Garbage	10,738	271	2.60	1409	1415	140
141	5-21-72	1087	Lone Star	1971	Ford	391	V-8	5	27,500	Delivery	13,669	333	3.36	1438	1411	141
142	5-22-72	496	ABC	1971	IHC	478	V-8	5	32,000	Rental	35,472	153	1.24	1035	1011	142
143	5-4-72	497	ABC	1971	IHC	478	V-8	5	32,000	Rental	22,187	236	1.58	1663	1517	143
144	5-22-72	503	ABC	1971	IHC	478	V-8	5	32,000	Rental	29,463	1922	1.77	1133	1153	144
145	5-17-72	3	JFC	1971	Chev.	350	V-8	4	24,000	Delivery	19,492	143	0.87	1115	1102	145
146	5-11-72	1	JFC	1971	Chev.	350	V-8	4	24,000	Delivery	21,830	257	2.01	961	1024	146
147	5-12-72	5	JFC	1971	Chev	350	V-8	4	24,000	Delivery	21,216	162	1.27	1174	1274	147
148	5-12-72	2	JFC	1971	Chev.	350	V-8	4	24,000	Delivery	22,938	290	2.37	1110	1159	148
149	5-17-72	7	JFC	1971	Chev.	350	V-8	4	24,000	Delivery	22,608	121	1.71	844	819	149
150	5-11-72	4	JFC	1971	Chev.	350	V-8	4	24,000	Delivery	21,178	220	1.76	1140	1199	150
151	5-3-72	15T	Southern	1971	Chev.	427	V-8	5	32,500	Moving	24,024	232	1.82	1448	1370	151
152	5-10-72	6	JFC	1971	Chev.	350	V-8	4	24,000	Delivery	18,526	204	0.96	1438	1415	152

*Hi-lo means two-speed rear axle.

TABLE D-5. VEHICLE DESCRIPTION AND FIFTH ROUND EMISSION RESULTS
"18" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF MARCH 1, 1973)

Unit	Date	Truck		Vehicle		Engine		Trans.	GVW	Vehicle	Test	Emissions Results				Unit
No.	Tested	No.	Source	Year	Make	CID	Cyl.	Speeds*	lbs.	Type	Mileage	HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	No.
1	7-25-72	PO41001	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	13,961	244	1.36	1605	1573	1
2	7-25-72	PO40999	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	13,257	294	1.79	1632	1599	2
3	7-26-72	040997	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	15,745	221	1.65	847	822	3
4	7-26-72	PO41000	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	16,920	250	2.16	1386	1344	4
5	7-27-72	PO41002	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	9,437	249	1.74	603	633	5
6	8-2-72	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	28,552	216	1.61	2210	2186	6
7	7-31-72	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	27,867	228	3.80	1101	1092	7
8	8-1-72	351	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	27,573	117	2.00	1622	1573	8
9	8-1-72	350	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	28,311	298	2.74	2393	2321	9
10	7-31-72	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	28,755	180	3.00	1441	1431	10
11	11-12-72	24340	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	38,608	231	1.58	1575	1666	11
12	8-17-72	24341K	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	31,998	165	1.04	1506	1467	12
13	11-12-72	24343	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	37,044	234	2.63	1736	1837	13
14	11-12-72	24342	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	40,279	227	1.74	1344	1422	14
15	8-3-72	56	N. S. S. D.	1970	IHC	345	V8	5	22,500	School Bus	40,658	143	1.41	1317	1308	15
16	8-30-72	53	N. S. S. D.	1970	IHC	345	V8	5	25,500	School Bus	40,536	439	2.07	2779	2827	16
17	8-30-72	55	N. S. S. D.	1970	IHC	345	V8	5	25,500	School Bus	40,079	271	1.22	1829	1862	17
18	8-29-72	6	N. S. S. D.	1970	IHC	345	V8	5	22,000	School Bus	19,726	310	1.24	2671	2700	18
19	8-29-72	54	N. S. S. D.	1970	IHC	345	V8	5	22,000	School Bus		290	1.51	2455	2481	19
20	10-12-72	72341	Hertz	1970	Ford	300	6	3-auto	10,000	Stake	17,515	250	1.19	2421	2465	20
21	10-4-72	72218	Hertz	1970	Ford	240	6	3-auto	7,500	Pickup	30,968	304	2.45	1827	1772	21
22	8-2-72	5131	CPSB	1971	IHC	392	V8	3-auto	25,500	Line	16,686	296	4.33	904	894	22
23	8-4-72	5132	CPSB	1970	IHC	392	V8	3-auto	25,500	Line	11,100	198	1.39	1557	1528	23
24	8-9-72	5136	CPSB	1971	IHC	392	V8	3-auto	25,500	Line	14,548	296	2.22	1486	1486	24
25	8-11-72	5141	CPSB	1971	IHC	392	V8	3-auto	25,500	Line	3,958	129	1.86	724	766	25
26	8-18-72	4952	CPSB	1971	IHC	304	V8	4	14,000	Van	19,334	301	1.30	2786	2755	26
27	8-7-72	6615	CPSB	1970	Ford	300	6	4	10,000	Service	11,737	195	0.67	2433	2406	27
28	8-16-72	6616	CPSB	1970	Ford	300	6	4	10,000	Service	14,386	181	0.49	2535	2545	28
29	8-9-72	4824	CPSB	1970	Ford	300	6	4	16,000	Service	2,205	145	0.39	2009	2009	29
30	8-21-72	4726	CPSB	1970	Chev	292	6	4	9,000	Service	26,673	210	0.92	2217	2201	30
31	8-8-72	4728	CPSB	1970	Chev	250	6	4	7,500	Service	34,406	214	1.17	2322	2331	31
32	8-8-72	4729	CPSB	1970	Chev	250	6	4	7,500	Service	15,055	230	1.54	1917	1925	32
33	Transferred to another city															33
34	Transferred to another city															34
35	Transferred to another city															35
36	8-24-7	4727	CPSB	1970	Chev	250	6	4	7,500	Service	13,496	371	2.09	2085	2085	36
37	8-21-72	4730	CPSB	1970	Chev	250	6	4	7,500	Service	16,982	261	1.08	2740	2721	37
38	8-15-72	4951	CPSB	1970	IHC	304	V8	4	14,000	Service	29,053	261	1.36	2613	2728	38
39	9-7-72	8810	CPSB	1970	Ford	300	6	4	16,000	Service	27,812	283	3.09	1844	1837	39
40	8-14	8811	CPSB	1970	Ford	300	6	4	16,000	Service	24,476	165	0.22	3637	3577	40
41	8-11-72	6855	CPSB	1970	Ford	300	6	4	16,000	Service	25,184	208	0.53	978	1035	41
42	8-7-72	6617	CPSB	1970	Ford	300	6	4	10,000	Wrecker	5,532	188	0.55	2407	2381	42
43	9-7-72	6856	CPSB	1970	Ford	300	6	4	16,000	Service	18,794	137	0.47	2973	2962	43
44	9-15-72	4671	CPSB	1970	Ford	300	6	4	10,000	Stake	13,083	187	0.45	2781	2707	44
45	8-14-72	6857	CPSB	1970	Ford	300	6	4	16,000	Service	22,758	212	0.51	2415	2442	45
46	8-22-72	4950	CPSB	1970	IHC	304	V8	4	19,700	Bucket Truck	38,930	269	1.85	2032	1861	46
47	9-30-72	312	CWB	1970	IHC	304	V8	4	19,700	Service	28,460	2031	0.72	1985	1649	47
48	10-7-72	314	CWB	1970	IHC	304	V8	4	19,700	Service	12,358	217	1.42	2270	2147	48
49	10-9-72	301	CWB	1970	IHC	304	V8	4	10,000	Crew Truck	15,091	235	1.60	2438	2431	49
50	10-9-72	302	CWB	1970	IHC	304	V8	4	10,000	Crew Truck	13,846	189	2.20	1853	1847	50

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*Hi-lo means two-speed rear axle.

TABLE D-5 (Cont'd). VEHICLE DESCRIPTION AND FIFTH ROUND EMISSION RESULTS
"18" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF MARCH 1, 1973)

												Emissions Results				
														NO, ppm		
Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW lbs.	Vehicle Type	Test Mileage	HC, ppm	CO, %	Obs.	Corr.	Unit No.
51	9-25-72	93	Pearl	1970	IHC	304	V8	3	7,500	Delivery	21,279	313	1.78	2179	2188	51
52	9-27-72	105	Pearl	1970	GMC	292	6	3	7,500	Delivery	24,222	316	0.64	3337	3249	52
53	9-28-72	106	Pearl	1970	Dodge	318	V8	3	7,500	Delivery	21,975	293	1.57	2366	2357	53
54	9-27-72	122	Pearl	1970	Ford	300	6	3	7,500	Delivery	34,208	192	0.27	4047	3940	54
55	9-9-72	311	CWB	1970	IHC	304	V8	4	19,700	Service	8,974	249	1.42	2273	2344	55
56	9-9-72	313	CWB	1970	IHC	304	V8	4	19,700	Service	14,607	211	1.36	2333	2414	56
57	10-10-72	315	CWB	1970	IHC	304	V8	4	19,700	Service	13,227	216	1.55	1925	1985	57
58	9-9-72	316	CWB	1970	IHC	304	V8	4	19,700	Service	6,547	193	1.13	1761	1780	58
59	9-9-72	317	CWB	1970	IHC	304	V8	4	19,700	Service	10,870	254	1.14	2699	2728	59
60	9-30-72	253	CWB	1970	Chev	307	V8	4	7,500	Service	9,157	3906	1.92	923	820	60
61	9-30-72	254	CWB	1970	Chev	307	V8	4	7,500	Service	17,062	2136	1.86	1282	1103	61
62	9-16-72	391	CWB	1970	Chev	366	V8	5	32,000	Crane	4,313	180	1.00	1125	1175	62
63	9-16-72	392	CWB	1970	Chev	366	V8	5	32,000	Crane	3,329	139	1.79	701	732	63
64	9-14-72	582	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight		485	1.53	1986	1985	64
65	9-14-72	581	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight		368	1.94	2095	2015	65
66	9-30-72	251	CWB	1970	Dodge	318	V8	3-auto	7,500	Meter	15,384	235	1.61	1237	1088	66
67	9-16-72	252	CWB	1970	Dodge	318	V8	3	7,500	Service	11,915	246	1.58	2257	2232	67
68	10-10-72	360	CWB	1970	Ford	361	V8	5	25,500	Dump	20,277	256	2.37	1623	1623	68
69	9-13-72	5133	CPSB	1970	IHC	392	V8	6-auto	25,500	Line	17,555	119	1.34	1032	1043	69
70	9-19-72	5140	CPSB	1970	IHC	392	V8	6-auto	25,500	Line	31,006	281	2.38	1212	1250	70
71	9-21-72	5097	CPSB	1971	IHC	345	V8	5	25,000	Digger	19,304	282	1.72	2143	2196	71
72	9-13-72	5106	CPSB	1971	IHC	345	V8	5	25,000	Digger	20,640	216	1.00	2146	2169	72
73	9-19-72	5130	CPSB	1970	IHC	392	V8	6-auto	25,500	Line	23,328	346	3.17	1376	1419	73
74	9-21-72	5153	CPSB	1970	IHC	392	V8	6-auto	25,500	Line	18,488	301	2.81	1408	1438	74
75	10-14-72	M-78	State Hosp.	1970	Dodge	225	6	4	7,500	Pickup	7,821	297	2.03	2441	2451	75
76	10-14-72	M-80	State Hosp.	1970	Dodge	225	6	4	7,500	Pickup	3,204	238	2.04	1667	1674	76
77	10-14-72	M-98	State Hosp.	1970	Dodge	225	6	4	7,500	Pickup	3,884	247	1.86	2122	2099	77
78	10-15-72	SH-680	State Hosp.	1970	Ford	302	V8	3-auto	6,800	Van		252	0.99	2501	2473	78
79	11-4-72	SH-699	State Hosp.	1970	GMC	401	V6	5	27,000	Bus	17,822	252	5.03	1162	1027	79
80	Over 50,000 miles.															80
81	10-5-72	134	Herder	1970	Ford	300	6	5	21,000	Freight	35,495	305	4.80	1030	1003	81
82	10-5-72	135	Herder	1970	Ford	300	6	5	21,000	Freight	23,212	314	0.48	3305	3219	82
83	10-4-72	239	Herder	1970	Ford	361	V8	5	22,000	Freight	21,777	335	1.50	1953	1838	83
84	10-4-72	240	Herder	1970	Ford	361	V8	5	22,000	Freight	29,403	566	2.46	2258	2125	84
85	Wrecked															
86	10-15-72	L-41	State Hosp.	1970	Dodge	225	6	3-auto	10,000	Laundry	5,147	191	2.07	1673	1602	86
87	10-14-72	M-77	State Hosp.	1970	Dodge	225	6	3	10,000	Grounds	4,937	229	2.05	2129	2137	87
88	10-14-72	M-87	State Hosp.	1970	Dodge	225	6	3-auto	7,500	Service	11,193	204	1.81	1352	1337	88
89	10-15-72	M-90	State Hosp.	1970	Dodge	225	6	3-auto	10,000	Maint.	7,549	217	2.15	2120	2030	89
90	11-4-72	M-95	State Hosp.	1970	Dodge	225	6	3-auto	10,000	Grounds	4,862	193	1.76	2416	2136	90
91	10-25-72	2179	CP&R	1970	IHC	345	V8	4	19,000	Water Truck	2,061	142	0.95	1819	1617	91
92	10-21-72	2120	CP&R	1970	Ford	360	V8	4	8,300	Maint.	9,685	231	2.02	1654	1750	92
93	10-11-72	27	BMW	1970	Ford	360	V8	4	7,500	Repair	24,538	280	2.99	1545	1540	93
94	10-22-72	2073	CP&R	1970	Chev.	296	6	3-auto	14,000	Maint.	5,118	288	0.88	3073	2840	94
95	10-22-72	2121	CP&R	1970	Ford	360	V8	4	8,300	Maint.	4,098	270	2.51	1502	1474	95
96	10-26-72	4T1	BCRD	1970	Ford	240	6	3	7,500	Maint.	25,055	347	2.63	1215	1117	96
97	10-26-72	4T16	BCRD	1970	Ford	240	6	3	7,500	Welder	17,411	312	2.58	1358	1232	97
98	10-27-72	1T22	BCRD	1970	Ford	330	V8	5	21,000	Water Truck	23,689	268	0.67	2810	2810	98
99	10-27-72	2T9	BCRD	1970	Ford	330	V8	4	21,000	Water Truck	25,149	299	0.91	3129	3129	99
100	10-27-72	2T12	BCRD	1970	Ford	330	V8	4	21,000	Water Truck	21,854	306	1.24	2406	2406	100

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*Hi-lo means two-speed rear axle.

TABLE D-5 (Cont'd). VEHICLE DESCRIPTION AND FIFTH ROUND EMISSION RESULTS "18" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF MARCH 1, 1973)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW lbs.	Vehicle Type	Test Mileage	Emissions Results				Unit No.
												HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	
101	10-26-72	4T23	BCRD	1970	Ford	330	V8	5	21,000	Water Truck	41,594	531	4.46	873	803	101
102	10-17-72	7	BMW	1970	Ford	360	V8	4	6,000	Maint.	26,432	476	3.28	1198	1194	102
103	Over 50,000 miles															103
104	10-24-72	2085	CP&R	1970	Chev.	307	V8	3	7,500	Maint.	19,682	174	2.81	2217	1970	104
105	10-25-72	2122	CP&R	1970	IHC	392	V8	5	25,500	Maint.	7,665	279	1.99	1812	1643	105
106	10-17-72	2119	CP&R	1970	Ford	360	V8	4	8,300	Maint.	7,228	171	1.74	1698	1667	106
107	10-22-72	2123	CP&R	1970	Chev.	307	V8	3	7,500	Maint.	7,377	270	1.98	1629	1505	107
108	10-18-72	2168	CP&R	1970	Chev	307	V8	4	10,000	Maint.	11,087	179	2.90	1650	1668	108
109	10-18-72	2169	CP&R	1970	Chev	307	V8	4	10,000	Maint.	3,807	224	2.69	1592	1609	109
110	10-19-72	2081	CP&R	1970	Chev	307	V8	3	7,500	Maint.	10,505	277	2.43	2107	1922	110
111	10-19-72	2082	CP&R	1970	Chev.	307	V8	3	7,500	Maint.	9,715	179	2.30	1715	1563	111
112	11-9-72	2170	CP&R	1970	Chev.	307	V8	4	10,000	Maint.	24,158	223	3.00	2009	1786	112
113	10-30-72	51342	CPSB	1971	IHC	392	V8	6-auto	24,000	Construction	8,935	280	3.38	947	947	113
114	10-31-72	51375	CPSB	1971	IHC	392	V8	6-auto	25,500	Construction	21,324	176	2.38	1165	1209	114
115	10-30-72	51383	CPSB	1971	IHC	392	V8	6-auto	25,500	Construction	22,949	265	1.66	1856	1856	115
116	10-27-72	4364	Elmore	1970	GMC	350	V8	4	14,000	Moving	8,277	223	2.99	926	926	116
117	1-31-73	16	Elmore	1970	GMC	350	V8	4	10,000	Moving	8,029	192	2.14	1680	1361	117
118	11-1-72	043247	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Mail	11,489	218	1.92	1378	1199	118
119	10-31-72	043144	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Mail	16,424	322	2.42	1235	1282	119
120	11-2-72	043327	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Mail	11,773	267	2.00	1450	1326	120
121	Not available this round															121
122	Not available this round															122
123	Not available this round															123
124	Not available this round															124
125	11-1-72	043221	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Delivery	13,379	294	2.43	1224	1065	125
126	11-2-72	042519	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Delivery	8,992	251	2.13	1476	1352	126
127	11-4-72	1085	Lone Star	1971	Ford	391	V6	5	27,500	Delivery	12,133	229	0.96	2557	2273	127
128	11-4-72	1086	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	21,257	604	0.56	2824	2510	128
129	11-4-72	1088	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	20,260	330	2.58	2343	2082	129
130	Converted to LPG															130
131	1-30-73	1347	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	20,150	198	2.33	1795	1436	131
132	1-31-73	1355	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	19,10	185	7.07	428	433	132
133	Converted to LPG															133
134	11-7-72	1348	CPW	1971	IHC	392	V8	6-auto	34,000	Garbage	17,622	206	2.06	2135	1877	134
135	1-30-73	1345	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	19,710	696	4.93	2948	2358	135
136	11-6-72	1349	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	13,972	250	2.91	1963	2018	136
137	1-31-73	1365	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	17,129	314	1.87	2491	2519	137
138	11-6-72	1346	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	17,468	246	2.68	1928	1982	138
139	11-7-72	1346	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	15,406	245	1.94	1905	1674	139
140	11-9-72	1363	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	17,401	222	3.32	1659	1475	140
141	11-4-72	1087	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	19,476	336	3.95	1572	1397	141
142	11-30-72	496	ABC	1971	IHC	478	V8	5	32,000	Rental	58,868	206	1.17	2038	1773	142
143	11-14-72	497	ABC	1971	IHC	478	V8	5	32,000	Rental	44,653	263	2.63	1376	1087	143
144	11-21-72	503	ABC	1971	IHC	478	V8	5	32,000	Rental	38,980	273	1.92	2040	1785	144
145	11-13-72	3	JFC	1971	Chev.	350	V8	4	24,000	Delivery	30,076	301	1.42	2034	1637	145
146	11-20-72	1	JFC	1971	Chev.	350	V8	4	24,000	Delivery	33,132	305	2.52	1419	1164	146
147	11-20-72	5	JFC	1971	Chev.	350	V8	4	24,000	Delivery	30,487	227	1.74	1246	1048	147
148	11-13-72	2	JFC	1971	Chev.	350	V8	4	24,000	Delivery	34,605	547	2.94	1288	1051	148
149	11-13-72	7	JFC	1971	Chev.	350	V8	4	24,000	Delivery	31,665	265	2.45	468	374	149
150	11-13-72	4	JFC	1971	Chev.	350	V8	4	24,000	Delivery	29,442	206	1.28	2279	1860	150
151	11-9-72	276-15T	Southern	1971	Chev.	427	V8	5	32,500	Moving Co.	36,665	193	1.55	2308	1895	151
152	11-20-72	6	JFC	1971	Chev.	350	V8	4	24,000	Delivery	29,637	209	1.38	1758	1435	152

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*Hi-lo means two-speed rear axle.

TABLE D-6. VEHICLE DESCRIPTION AND SIXTH ROUND EMISSION RESULTS "24" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF AUGUST 1, 1973)

Unit No	Date Tested	Truck No	Source	Vehicle Year	Make	Engine CID	Cyl	Trans. Speeds*	GVW lbs.	Vehicle Type	Test Mileage	Emissions Results				Unit No.
												HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	
1	2-1-73	PO41001	P.O.D.	1970	Dodge	318	V8	3-auto	10,000	Van	17,497	260	1.61	2353	1807	1
2	2-5-73	PO40999	P.O.D.	1970	Dodge	318	V8	3-auto	10,000	Van	16,873	338	1.92	1679	1595	2
3	2-2-73	PO40997	P.O.D.	1970	Dodge	318	V8	3-auto	10,000	Van	19,195	318	1.94	1976	1539	3
4	2-2-73	PO41000	P.O.D.	1970	Dodge	318	V8	3-auto	10,000	Van	20,695	306	2.44	1753	1366	4
5	2-1-73	PO41002	P.O.D.	1970	Dodge	318	V8	3-auto	10,000	Van	11,826	274	1.82	1276	980	5
6	2-12-73	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	36,409	154	1.52	2023	1938	6
7	2-13-73	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	35,114	187	3.95	1170	964	7
8	2-12-73	351	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	35,874	237	2.54	2323	2225	8
9	2-13-73	350	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	34,999	161	2.62	1962	1670	9
10	3-8-73	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	37,971	170	3.26	1762	1811	10
11	6-25-73	24340	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	56,313	319	1.78	1446	1486	11
12	3-26-73	24341K	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	44,863	173	1.06	1143	949	12
13	3-27-73	24343	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	45,967	417	2.77	1101	1042	13
14	3-27-73	24342	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	48,629	339	2.60	957	905	14
15	2-6-73	56	N.S.S.D.	1970	IHC	345	V8	5	25,500	School Bus	50,481	291	1.55	1606	1606	15
16	2-14-73	53	N.S.S.D.	1970	IHC	345	V8	5	25,500	School Bus	52,762	343	2.15	2060	1648	16
17	2-6-73	55	N.S.S.D.	1970	IHC	345	V8	5	25,500	School Bus	3,620	219	1.26	1805	1805	17
18	2-7-73	6	N.S.S.D.	1970	IHC	345	V8	5	22,000	School Bus	27,364	172	1.51	2387	2413	18
19	2-7-73	54	N.S.S.D.	1970	IHC	345	V8	5	22,000	School Bus	33,347	217	1.62	1659	1677	19
20	3-12-73	72341	Hertz	1970	Ford	300	6	3-auto	10,000	Stake	24,342	161	1.13	2613	2762	20
21	3-29-73	72218	Hertz	1970	Ford	240	6	3-auto	7,500	Pick-up	37,915	205	0.65	1909	1894	21
22	2-15-73	5131	C.P.S.B.	1971	IHC	392	V8	3-auto	25,500	Line	22,960	249	2.61	1808	1464	22
23	2-23-73	5132	C.P.S.B.	1970	IHC	392	V8	3-auto	25,500	Line	14,517	326	2.13	466	392	23
24	2-15-73	5136	C.P.S.B.	1971	IHC	392	V8	3-auto	25,500	Line	20,935	320	2.34	2147	1827	24
25	3-6-73	5141	C.P.S.B.	1971	IHC	392	V8	3-auto	25,500	Line	4,894	332	2.38	1773	1473	25
26	2-19-73	4952	C.P.S.B.	1971	IHC	304	V8	4	14,000	Van	22,711	270	1.26	2889	2646	26
27	2-16-73	6615	C.P.S.B.	1970	Ford	300	6	4	10,000	Service	15,949	225	0.67	3164	2547	27
28	2-16-73	6616	C.P.S.B.	1970	Ford	300	6	4	10,000	Service	18,359	238	0.57	3055	2459	28
29	2-20-73	4824	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	2,103	151	0.35	3265	2645	29
30	3-2-73	4726	C.P.S.B.	1970	Chev.	292	6	4	9,000	Service	35,124	252	1.17	2885	2537	30
31	3-1-73	4728	C.P.S.B.	1970	Chev.	250	6	4	7,500	Service	45,359	228	1.53	2951	2623	31
32	2-27-73	47290	C.P.S.B.	1970	Chev.	250	6	4	7,500	Service	20,084	295	1.57	2409	2279	32
33		671	Brown Exp.	1971	Ford	300	6	5	24,000	Van	Transferred to another city					33
34		672	Brown Exp.	1971	Ford	300	6	5	24,000	Van	Transferred to another city					34
35		673	Brown Exp.	1971	Ford	300	6	5	24,000	Van	Transferred to another city					35
36	2-27-73	4727	C.P.S.B.	1970	Chev.	250	6	4	7,500	Service	16,772	266	2.02	2118	1853	36
37	3-1-73	4730	C.P.S.B.	1970	Chev.	250	6	4	7,500	Service	22,579	229	1.08	2911	2588	37
38	2-19-73	4951	C.P.S.B.	1970	IHC	304	V8	4	14,000	Service	33,532	283	1.18	2546	2332	38
39	2-23-73	8810	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	35,604	216	0.60	2733	2298	39
40	2-22-73	8811	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	31,686	179	0.39	3667	3311	40
41	2-22-73	6855	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	29,942	204	0.66	3266	2949	41
42	2-21-73	6617	C.P.S.B.	1970	Ford	300	6	4	10,000	Wrecker	7,881	192	0.40	2956	2669	42
43	2-21-73	6856	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	24,065	131	0.40	3514	3173	43
44	3-6-73	4671	C.P.S.B.	1970	Ford	300	6	4	10,000	Stake	16,459	210	1.04	3001	2494	44
45	2-26-73	6857	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	28,906	253	3.65	2186	2040	45
46	3-5-73	4950	C.P.S.B.	1970	IHC	304	V8	4	19,700	Bucket Truck	51,372	30	2.26	2394	2461	46
47	3-19-73	312	C.W.B.	1970	IHC	304	V8	4	19,700	Service	35,643	742	1.73	1768	1571	47
48	6-20-73	314	C.W.B.	1970	IHC	304	V8	4	19,700	Service	16,767	233	1.93	2204	2213	48
49	3-13-73	301	C.W.B.	1970	IHC	304	V8	4	10,000	Crew Truck	17,760	253	1.82	1526	1528	49
50	6-20-73	302	C.W.B.	1970	IHC	304	V8	4	10,000	Crew Truck	19,100	231	2.18	2017	2073	50

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* Hi-lo means two-speed rear axle.

TABLE D-6 (Cont'd). VEHICLE DESCRIPTION AND SIXTH ROUND EMISSION RESULTS
"24" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF AUGUST 1, 1973)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW lbs.	Vehicle Type	Test Mileage	Emissions Results HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
51	3-2-73	93	Pearl	1970	IHC	304	V8	3	7,500	Delivery	27,268	268	1.90	2548	2240	51
52		105	Pearl	1970	GMC	292	6	3	7,500	Pickup	Over 50,000 miles					52
53	2-28-73	106	Pearl	1970	Dodge	318	V8	3	7,500	Delivery	25,655	284	1.51	2687	2426	53
54		122	Pearl	1970	Ford	300	6	3	7,500	Pickup	Over 50,000 miles					54
55	3-14-73	311	C. W. B.	1970	IHC	304	V8	4	19,700	Service	15,370	270	1.80	1453	1392	55
56	3-15-73	313	C. W. B.	1970	IHC	304	V8	4	19,700	Service	6,116	203	1.35	1548	1294	56
57	3-19-73	315	C. W. B.	1970	IHC	304	V8	4	19,700	Service	15,911	192	2.01	2400	2133	57
58	3-15-73	316	C. W. B.	1970	IHC	304	V8	4	19,700	Service	9,532	704	1.81	1604	1543	58
59	3-15-73	317	C. W. B.	1970	IHC	304	V8	4	19,700	Service	14,800	234	2.00	2283	2196	59
60	3-12-73	253	C. W. B.	1970	Chev	307	V8	4	7,500	Service	12,166	2082	2.74	559	591	60
61	3-13-73	254	C. W. B.	1970	Chev	307	V8	4	7,500	Service	19,731	2006	2.83	656	856	61
62	3-15-73	391	C. W. B.	1970	Chev	266	V8	5	3,200	Crane	5,636	202	1.25	894	860	62
63	3-14-73	392	C. W. B.	1970	Chev	366	V8	5	3,200	Crane	4,635	184	2.19	406	389	63
64	3-8-73	582	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	52,981	2857	1.73	1969	2045	64
65	3-8-73	581	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	29,287	1487	1.86	1952	2007	65
66	3-12-73	251	C. W. B.	1970	Dodge	318	V8	3-auto	7,500	Meter	19,634	265	2.05	1902	2010	66
67	3-12-73	252	C. W. B.	1970	Dodge	318	V8	3-auto	7,500	Service	15,108	327	2.16	1792	1894	67
68	3-14-73	360	C. W. B.	1970	Ford	361	V8	5	25,500	Dump	12,015	242	2.65	1504	1440	68
69	3-6-73	5133	C. P. S. B.	1970	IHC	392	V8	6-auto	25,500	Line	23,258	190	1.31	2316	1925	69
70	3-5-73	5140	C. P. S. B.	1970	IHC	392	V8	6-auto	25,500	Line	40,370	291	3.17	1467	1493	70
71	3-6-73	5097	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	24,177	242	1.74	2679	2226	71
72	3-6-73	5106	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	25,777	228	0.99	2752	2287	72
73	2-20-73	5130	C. P. S. B.	1970	IHC	392	V8	6-auto	25,500	Line	30,051	285	2.96	1429	1157	73
74	2-26-73	5135	C. P. S. B.	1970	IHC	392	V8	6-auto	25,500	Line	23,910	2062	2.26	1388	1295	74
75	3-13-73	M-78	State Hos.	1969	Dodge	225	6	4	7,500	Pickup	9,643	247	2.25	2373	1849	75
76	3-31-73	M-80	State Hos.	1970	Dodge	225	6	4	7,500	Pickup	4,196	213	2.03	2048	1628	76
77	3-31-73	M-98	State Hos.	1969	Dodge	225	6	4	7,500	Pickup	4,806	220	1.82	2494	1983	77
78	3-31-73	SH-680	State Hos.	1970	Ford	302	V8	3-auto	6,800	Van	12,765	235	1.05	2216	1761	78
79	6-26-73	SH-699	State Hos.	1970	GMC	401	V6	5	27,000	Bus	21,490	346	5.60	1097	1076	79
80		1029	Lone Star	1970	Chev	307	V8	4	6,600	Pickup	Over 50,000 miles					80
81		134	Herder	1970	Ford	300	6	5	21,000	Freight	Over 50,000 miles					81
82	3-7-73	135	Herder	1970	Ford	300	6	5	21,000	Freight	28,291	143	0.35	2360	2152	82
83	3-7-73	239	Herder	1970	Ford	361	V8	5	22,000	Freight	28,973	291	1.69	2425	2212	83
84	3-7-73	240	Herder	1970	Ford	361	V8	5	22,000	Freight	34,916	364	2.79	1919	1750	84
85		250	C. W. B.	1970	Chev	307	V8	2-auto	7,500	Service	Wrecked					85
86	3-31-73	L-41	State Hos.	1970	Dodge	225	6	3-auto	10,000	Laundry	6,462	196	2.09	1874	1491	86
87	6-26-73	M-77	State Hos.	1970	Dodge	225	6	3-auto	10,000	Grounds	6,605	268	2.30	2233	2331	87
88	4-7-73	M-87	State Hos.	1970	Dodge	225	6	3-auto	7,500	Service	13,925	237	2.09	2140	2049	88
89	6-26-73	M-90	State Hos.	1970	Dodge	225	6	3-auto	10,000	Maint.	10,316	328	2.53	2332	2435	89
90	3-31-73	M-95	State Hos.	1970	Dodge	225	6	3-auto	10,000	Grounds	5,830	187	1.96	2223	1732	90
91	3-23-73	2179	City P&R	1970	IHC	345	V8	4	19,000	Water truck	2,732	192	1.01	1891	1931	91
92	3-21-73	2120	City P&R	1970	Ford	360	V8	4	8,300	Maint.	11,819	220	2.04	1675	1457	92
93	3-9-73	27	B. M. W.	1970	Ford	360	V8	4	6,100	Repair	30,084	335	3.37	1341	1425	93
94	3-20-73	2073	City P&R	1970	Chev	292	6	3-auto	14,000	Maint.	6,534	157	0.58	3180	2544	94
95	3-21-73	2121	City P&R	1970	Ford	360	V8	4	8,300	Maint.	6,179	277	2.71	1886	1641	95
96	3-28-73	4T1	B. C. R. D.	1970	Ford	240	6	3	7,500	Maint.	30,748	302	2.37	1607	1526	96
97	3-29-73	4T16	B. C. R. D.	1970	Ford	240	6	3	7,500	Maint.	18,272	318	2.42	1364	1295	97
98	3-29-73	1T22	B. C. R. D.	1970	Ford	330	V8	5	21,000	Water truck	29,582	213	0.88	2656	2636	98
99	3-29-73	2T9	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water truck	18,272	272	1.04	2968	2940	99
100	3-29-73	2T12	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water truck	25,999	311	1.61	1952	1938	100

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*Hi-lo means two-speed rear axle.

TABLE D-6 (Cont'd). VEHICLE DESCRIPTION AND SIXTH ROUND EMISSION RESULTS
"24" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF AUGUST 1, 1973)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl	Trans Speeds*	GVW lbs	Vehicle Type	Test Mileage	Emission Results				Unit No.
												HC, ppm	CO, %	NO, ppm Obs	NO, ppm Corr.	
101	3-28-73	4T23	B. C. R. D.	1970	Ford	330	V8	5	21,000	Watertruck	34,812	547	4.57	1032	980	101
102	3-9-73	7	B. M. W.	1970	Ford	360	V8	4	6,100	Maint.	33,362	283	3.37	1053	1119	102
103		34	Southern	1970	GMC	427	V8	5	32,500	Tractor	Over 50,000 miles					103
104	3-22-73	2085	City P&R	1970	Chev.	307	V8	3	7,500	Maint.	24,317	208	2.60	2195	2153	104
105	3-26-73	2122	City P&R	1970	IHC	392	V8	5	25,500	Maint.	9,454	266	2.36	1712	1431	105
106	3-21-73	2119	City P&R	1970	Ford	360	V8	4	8,300	Maint.	6,809	164	2.74	1610	1400	106
107	3-23-73	2123	City P&R	1970	Chev.	307	V8	3	7,500	Maint.	8,885	200	2.03	1108	1132	107
108	3-22-73	2168	City P&R	1970	Chev.	307	V8	4	10,000	Maint.	13,801	203	3.25	1561	1531	108
109	3-26-73	2169	City P&R	1970	Chev.	307	V8	4	10,000	Maint.	7,128	224	2.40	1615	1342	109
110	3-20-73	2081	City P&R	1970	Chev.	307	V8	3	7,500	Maint.	13,431	224	2.42	1789	1431	110
111	3-20-73	2082	City P&R	1970	Chev.	307	V8	3	7,500	Maint.	12,230	170	2.25	1973	1578	111
112	3-22-73	2170	City P&R	1970	Chev.	307	V8	4	10,000	Maint.	28,860	315	3.04	1813	1779	112
113	4-3-73	51346	C. P. S. B.	1971	IHC	392	V8	6-auto	24,000	Const.	10,804	291	2.79	1380	1082	113
114	4-3-73	51375	C. P. S. B.	1971	IHC	392	V8	6-auto	25,500	Const.	26,186	182	1.88	1513	1186	114
115	4-3-73	51383	C. P. S. B.	1971	IHC	392	V8	6-auto	25,500	Const.	29,036	244	2.09	1480	1162	115
116		17	Elmore	1970	GMC	350	V8	4	14,000	Moving	No sixth round test					116
117	6-28-73	16	Elmore	1970	GMC	350	V8	4	10,000	Moving	10,600	174	1.18	1634	1641	117
118	4-4-73	043247	U. S. P. O.	1970	Dodge	318	V8	3-auto	7,000	Mail	14,461	225	1.61	1518	1141	118
119	6-21-73	043144	U. S. P. O.	1970	Dodge	318	V8	3-auto	7,000	Mail	22,075	258	2.17	1467	1473	119
120	4-4-73	043327	U. S. P. O.	1970	Dodge	318	V8	3-auto	7,000	Mail	15,521	308	2.09	1223	979	120
121	7-16-73	98	FACS	1970	GMC	292	6	4	10,000	Delivery	41,371	265	4.63	1045	1111	121
122	7-17-73	101	FACS	1970	GMC	292	6	4	10,000	Delivery	36,071	239	1.57	2692	2777	122
123		102	FACS	1970	GMC	292	6	4	10,000	Delivery	No sixth round test					123
124	7-18-73	105	FACS	1970	GMC	292	6	4	10,000	Delivery	29,341	104	0.796	1137	1137	124
125	4-4-73	PO043221	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Delivery	16,179	307	2.24	1309	984	125
126	4-5-73	042519	U. S. P. O.	1970	Dodge	318	V8	3-auto	10,000	Delivery	11,397	236	1.87	1457	1166	126
127	4-7-73	1085	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	15,626	240	1.50	2639	2527	127
128	6-20-73	1086	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	29,993	845	1.48	2549	2645	128
129	4-7-73	1088	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	18,209	313	2.81	1833	1755	129
130		1353	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	Converted to LPG					130
131	5-3-73	1347	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	22,875	258	3.85	1291	1110	131
132	5-4-73	1355	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	21,571	450	8.04	317	285	132
133		1340	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	Converted to LPG					133
134	5-4-73	1348	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	23,906	237	4.96	815	806	134
135	7-5-73	1345	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	24,205	519	8.23	367	399	135
136	5-3-73	1349	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	19,613	232	1.74	2333	2006	136
137	5-2-73	1365	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	19,910	367	2.45	2190	2124	137
138	5-2-73	1346	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	23,524	254	4.54	1223	1186	138
139	7-5-73	1364	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	23,178	233	1.93	1804	1959	139
140	5-2-73	1363	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	17,401	350	3.71	1342	1302	140
141	4-7-73	1087	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	24,688	393	4.53	1379	1274	141
142		496	ABC	1971	IHC	478	V8	5	32,000	Tractor	Over 50,000 miles					142
143	6-19-73	497	ABC	1971	IHC	478	V8	5	32,000	Tractor	53,560	324	2.65	1143	1148	143
144	7-2-73	503	ABC	1971	IHC	478	V8	5	32,000	Tractor	47,282	319	1.84	2373	2382	144
145	5-7-73	3	JFC	1971	Chev.	350	V8	4	24,000	Delivery	38,190	360	1.52	2575	2585	145
146	6-18-73	1	JFC	1971	Chev.	350	V8	4	24,000	Delivery	42,632	318	3.63	823	838	146
147	5-7-73	5	JFC	1971	Chev.	350	V8	4	24,000	Delivery	40,756	246	1.97	1160	1082	147
148	6-25-73	2	JFC	1971	Chev.	350	V8	4	24,000	Delivery	50,560	344	1.49	1323	1351	148
149	5-7-73	7	JFC	1971	Chev.	350	V8	4	24,000	Delivery	39,855	892	2.52	1047	921	149
150	6-19-73	4	JFC	1971	Chev.	350	V8	4	24,000	Delivery	37,814	375	1.86	1364	1369	150
151		157	Southern	1971	Chev.	427	V8	5	32,500	Moving	No sixth round test					151
152	5-7-73	6	JFC	1971	Chev.	350	V8	4	24,000	Delivery	39,976	322	1.94	2646	2657	152

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*Hi-lo means two-speed rear axle.

TABLE D-7. VEHICLE DESCRIPTION AND SEVENTH ROUND EMISSION RESULTS "30" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF FEBRUARY 1, 1974)

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW lbs.	Vehicle Type	Test Mileage	Emission Results HC, ppm	Emission Results CO, %	Emission Results NO, ppm Obs.	Emission Results NO, ppm Corr.	Unit No.
1	9-12-73	PO41001	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	21,930	443	2.18	1122	1126	1
2	9-12-73	PO40999	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	20,771	338	1.95	1732	1732	2
3	9-11-73	PO40997	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	24,079	313	1.87	941	951	3
4	9-13-73	PO41000	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	26,915	323	2.81	1137	1141	4
5	9-13-73	PO41002	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	14,413	377	1.99	752	755	5
6	9-24-73	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	47,459	253	1.77	1928	1936	6
7	9-25-73	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	44,057	295	4.23	1067	1067	7
8	9-11-73	351	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	45,548	303	3.11	1920	1955	8
9	9-17-73	350	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	44,916	352	4.42	1343	1317	9
10	9-24-73	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	47,464	228	3.85	1134	1134	10
11		24340	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	Over 50,000 mi.					11
12	11-6-73	24341K	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	51,197	220	1.32	1340	1364	12
13	11-6-73	24343	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	55,472	1901	1.83	1513	1540	13
14	11-2-73	24342	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	56,181	670	2.74	998	1009	14
15		56	N. S. S. D	1970	IHC	345	V8	5	25,500	School Bus	Over 50,000 mi.					15
16		53	N. S. S. D.	1970	IHC	345	V8	5	25,500	School Bus	Over 50,000 mi.					16
17		55	N. S. S. D	1970	IHC	345	V8	5	25,500	School Bus	Over 50,000 mi.					17
18	9-14-73	6	N. S. S. D.	1970	IHC	345	V8	5	22,000	School Bus	34,340	2016	1.53	1994	2002	18
19	9-14-73	54	N. S. S. D.	1970	IHC	345	V8	5	22,000	School Bus	43,309	313	1.67	2028	2035	19
20		72341	Hertz	1970	Ford	300	6	3 auto	10,000	Stake	Transferred to another city					20
21		72218	Hertz	1970	Ford	240	6	3 auto	7,500	Pickup	Transferred to another city					21
22	9-21-73	5131	C. P. S. B.	1971	IHC	392	V8	3-auto	25,500	Line	28,756	365	3.38	1403	1403	22
23	10-10-73	5132	C. P. S. B.	1970	IHC	392	V8	3-auto	25,500	Line	18,415	271	6.46	294	300	23
24	9-21-73	5136	C. P. S. B.	1971	IHC	392	V8	3-auto	25,500	Line	29,758	267	2.60	651	654	24
25	10-8-73	5141	C. P. S. B.	1971	IHC	392	V8	3-auto	25,500	Line	5,945	175	2.09	1041	1045	25
26	10-1-73	4952	C. P. S. B.	1971	IHC	304	V8	4	14,000	Van	26,522	361	1.61	2500	2528	26
27	9-27-73	6615	C. P. S. B.	1970	Ford	300	6	4	10,000	Service	20,742	306	1.13	2669	2669	27
28	9-27-73	6616	C. P. S. B.	1970	Ford	300	6	4	10,000	Service	23,420	262	0.54	2722	2722	28
29	9-20-73	4824	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	26,435	235	0.41	3228	3328	29
30	10-2-73	4726	C. P. S. B.	1970	Chev	292	6	4	9,000	Service	44,770	251	2.28	2234	2218	30
31	9-20-73	4728	C. P. S. B.	1970	Chev	250	6	4	7,500	Service	59,194	308	2.08	2084	2149	31
32	9-17-73	4729	C. P. S. B.	1970	Chev	250	6	4	7,500	Service	24,972	277	1.45	2294	2372	32
33		671	Brown Exp.	1971	Ford	300	6	5	24,000	Van	Transferred to another city					33
34		672	Brown Exp.	1971	Ford	300	6	5	24,000	Van	Transferred to another city					34
35		673	Brown Exp.	1971	Ford	300	6	5	24,000	Van	Transferred to another city					35
36	9-17-73	4727	C. P. S. B.	1970	Chev	250	6	4	7,500	Service	19,952	290	2.08	1876	1940	36
37		4730	C. P. S. B.	1970	Chev	250	6	4	7,500	Service	Wrecked					37
38	9-18-73	4951	C. P. S. B.	1970	IHC	304	V8	4	14,000	Service	37,925	367	1.63	2056	2099	38
39	9-25-73	8810	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	45,731	286	0.70	3391	3391	39
40	9-19-73	8811	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	40,878	261	0.84	2928	3139	40
41	10-9-73	6655	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	36,003	222	0.55	2674	2722	41
42	9-28-73	6617	C. P. S. B.	1970	Ford	300	6	4	10,000	Wrecker	11,6[illegible]	235	0.53	3017	3029	42
43	10-11-73	6856	C. P. S. B.	1970	Ford	300	6	4	16,000	Service	31,283	217	0.52	3576	3769	43
44	10-11-73	4671	C. P. S. B.	1970	Ford	300	6	4	10,000	Stake	21,724	210	0.87	2230	2275	44
45	9-19-73	6857	C. P. S. D.	1970	Ford	300	6	4	16,000	Service	35,640	212	0.62	3168	3396	45
46		4950	C. P. S. B.	1970	IHC	304	V8	4	19,700	Bucket Tr.	Over 50,000 miles					46
47	10-17-73	312	C. W. B.	1970	IHC	304	V8	4	19,700	Service	45,541	248	1.54	2130	2002	47
48	10-18-73	314	C. W. B.	1970	IHC	304	V8	4	19,700	Service	17,967	267	1.66	2155	1918	48
49	10-15-[illegible]	301	C. W. B.	1970	IHC	304	V8	4	10,000	Crew Truck	22,486	240	2.43	1719	1822	49
50	10-15-73	302	C. W. B.	1970	IHC	304	V8	4	10,000	Crew Truck	21,919	501	4.96	1060	1124	50

Hi-lo means two-speed rear axle.

TABLE D-7 (Cont'd). VEHICLE DESCRIPTION AND SEVENTH ROUND EMISSION RESULTS "30" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF FEBRUARY 1, 1974)

												Emissions Results				
Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW lbs.	Vehicle Type	Test Mileage	HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
51	10-22-73	93	Pearl	1970	IHC	304	V8	3	7,500	Delivery	38,100	249	1.79	1906	1778	51
52		105	Pearl	1970	GMC	292	6	3	7,500	Pickup	Over 50,000 miles					52
53	10-22-73	106	Pearl	1970	Dodge	318	V8	3	7,500	Delivery	32,375	292	1.63	2536	2366	53
54		122	Pearl	1970	Ford	300	6	3	7,500	Pickup	Over 50,000 miles					54
55	10-15-73	311	C. W. B.	1970	IHC	304	V8	4	19,700	Service	20,610	296	1.66	1920	2035	55
56	10-17-73	313	C. W. B.	1970	IHC	304	V8	4	19,700	Service	28,461	267	2.42	1683	1582	56
57	11-9-73	315	C. W. B.	1970	IHC	304	V8	4	19,700	Service	19,684	244	1.75	2271	2228	57
58	10-16-73	316	C. W. B.	1970	IHC	304	V8	4	19,700	Service	11,858	249	1.45	2217	2150	58
59	10-16-73	317	C. W. B.	1970	IHC	304	V8	4	19,700	Service	18,270	254	1.32	2652	2572	59
60	10-18-73	253	C. W. B.	1970	Chev	307	V8	4	7,500	Service	15,104	213	3.09	1659	1609	60
61	10-18-73	254	C. W. B.	1970	Chev	307	V8	4	7,500	Service	24,762	236	3.22	1543	1497	61
62	10-17-73	391	C. W. B.	1970	Chev	366	V8	5	32,000	Crane	7,455	143	1.18	995	1065	62
63	10-16-73	392	C. W. B.	1970	Chev	366	V8	5	32,000	Crane	6,120	280	5.56	636	617	63
64		582	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	Over 50,000 miles					64
65	11-1-73	581	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	36,594	2106	2.19	1634	1616	65
66	10-12-73	251	C. W. B.	1970	Dodge	318	V8	3-auto	7,500	Meter	23,042	302	2.23	1609	1644	66
67		252	C. W. B.	1970	Dodge	318	V8	3-auto	7,500	Service	16,659	210	2.03	1053	1000	67
68	11-9-73	360	C. W. B.	1970	Ford	361	V8	5	25,500	Dump	32,272	312	2.84	1938	1901	68
69	10-5-73	5133	C. P. S. B.	1970	IHC	392	V8	6-auto	25,500	Line	32,383	203	1.21	1878	1931	69
70	10-9-73	5140	C. P. S. B.	1970	IHC	392	V8	6-auto	25,500	Line	55,485	214	2.62	703	715	70
71	10-10-73	5097	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	30,359	351	1.90	1879	1918	71
72	10-4-73	5106	C. P. S. B.	1971	IHC	345	V8	5	25,000	Digger	33,216	261	1.33	2291	2392	72
73	10-3-73	5130	C. P. S. B.	1970	IHC	392	V8	6-auto	25,500	Line	40,085	352	3.48	990	983	73
74	10-5-73	5135	C. P. S. B.	1970	IHC	392	V8	6-auto	25,500	Line	33,160	138	1.95	937	963	74
75	11-19-73	M-78	State Hosp.	1970	Dodge	225	6	4	7,500	Pickup	13,081	289	2.53	2139	2220	75
76	11-16-73	M-80	State Hosp.	1970	Dodge	225	6	4	7,500	Pickup	5,535	203	1.91	1970	1941	76
77	11-16-73	M-98	State Hosp.	1970	Dodge	225	6	4	7,500	Pickup	6,223	251	1.72	2568	2270	77
78	11-15-73	SH-680	State Hosp.	1970	Ford	302	V8	3-auto	6,800	Van	15,481	256	1.13	2777	2430	78
79	11-15-73	SH-699	State Hosp.	1970	GMC	401	V6	5	27,000	Bus	26,213	292	5.75	1136	994	79
80		1029	Lone Star	1970	Chev	307	V8	4	6,600	Pickup	Over 50,000 miles					80
81		134	Herder	1970	Ford	300	6	5	21,000	Freight	Over 50,000 miles					81
82	10-19-73	135	Herder	1970	Ford	300	6	5	21,000	Freight	36,174	155	0.70	2881	2795	82
83	10-19-73	239	Herder	1970	Ford	361	V8	5	22,000	Freight	39,232	220	2.10	1509	1470	83
84	10-19-73	240	Herder	1970	Ford	361	V8	5	22,000	Freight	43,980	263	2.92	1490	1445	84
85		250	C. W. B.	1970	Chev.	307	V8	2-auto	7,500	Service	Wrecked					85
86	11-20-73	1-41	State Hosp.	1970	Dodge	225	6	3-auto	10,000	Laundry	8,454	268	2.46	2535	2132	86
87	11-20-73	M-77	State Hosp.	1970	Dodge	225	6	3-auto	10,000	Grounds	8,142	287	2.30	2416	2032	87
88	11-19-73	M-87	State Hosp.	1970	Dodge	225	6	3-auto	7,500	Service	17,952	274	2.20	2139	2220	88
89	11-21-73	M-90	State Hosp.	1970	Dodge	225	6	3-auto	10,000	Maint.	11,886	284	2.38	1843	1780	89
90	11-21-73	M-95	State Hosp.	1970	Dodge	225	6	3-auto	10,000	Grounds	7,543	199	1.95	2657	2567	90
91	10-27-73	2179	City P&R	1970	IHC	345	V8	4	19,000	Water truck	3,155	164	1.08	2204	2189	91
92	10-23-73	2120	City P&R	1970	Ford	360	V8	4	8,300	Maint.	15,008	249	2.15	1851	1773	92
93	11-2-73	27	B. M. W.	1970	Ford	360	V8	4	7,500	Repair	40,282	309	3.56	1313	1327	93
94	10-24-73	2073	City P&R	1970	Chev	292	6	3	14,000	Maint.	8,934	202	0.62	3183	3196	94
95		2121	City P&R	1970	Ford	360	V8	4	8,300	Maint.	9,126	301	2.56	1909	1829	95
96	10-29-73	4T1	B. C. R. D.	1970	Ford	240	6	3	7,500	Maint.	39,024	280	1.96	1971	1888	96
97	10-29-73	4T16	B. C. R. D.	1970	Ford	240	6	3	7,500	Welder	26,802	328	1.38	1974	1891	97
98	10-30-73	1T22	B. C. R. D.	1970	Ford	330	V8	5	21,000	Water truck	40,106	260	0.71	2583	2738	98
99	10-30-73	2T9	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water truck	35,002	342	1.14	2885	3058	99
100	10-30-73	2T12	B. C. R. D.	1970	Ford	330	V8	4	21,000	Water truck	30,808	309	1.24	2371	2513	100

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*Hi-lo means two-speed rear axle.

TABLE D-7 (Cont'd). VEHICLE DESCRIPTION AND SEVENTH ROUND EMISSION RESULTS
"30" MONTHS HEAVY-DUTY GASOLINE SURVEILLANCE (AS OF FEBRUARY 1, 1974)

												Emission Results				
Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW lbs.	Vehicle Type	Test Mileage	HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
101	10-23-73	4T23	B. C. R. D.	1970	Ford	330	V8	5	21,000	Water Truck	42,023	602	4.97	1289	1235	101
102	11-2-73	7	B. M. W.	1970	Ford	360	V8	4	6,000	Maint.	44,646	310	3.82	1455	1471	102
103		34	Southern	1970	GMC	427	V8	5	32,500	Tractor	Over 50,000 miles					103
104	10-23-73	2085	City P&R	1970	Chev	307	V8	3	7,500	Maint.	31,335	268	2.76	2243	2149	104
105	10-25-73	2122	City P&R	1970	IHC	392	V8	5	25,500	Maint.	12,707	242	4.75	673	687	105
106	10-27-73	2119	City P&R	1970	Ford	360	V8	4	8,300	Maint.	12,504	282	2.82	1724	1712	106
107	10-24-73	2123	City P&R	1970	Chev	307	V8	3	7,500	Maint.	11,980	205	2.23	1908	1902	107
108	10-24-73	2168	City P&R	1970	Chev	307	V8	4	10,000	Maint.	18,422	2151	2.21	1677	1672	108
109	10-25-73	2169	City P&R	1970	Chev	307	V8	4	10,000	Maint.	17,463	288	2.97	1965	2006	109
110	10-27-73	2081	City P&R	1970	Chev	307	V8	3	7,500	Maint.	18,014	290	2.80	1949	1935	110
111	10-27-73	2082	City P&R	1970	Chev	307	V8	3	7,500	Maint.	16,204	247	2.78	1879	1866	111
112	10-25-73	2170	City P&R	1970	Chev	307	V8	4	10,000	Maint.	36,764	1974	2.61	1720	1756	112
113	11-5-73	51346	C. P. S. B.	1971	IHC	392	V8	6-auto	24,000	Const.	13,894					113
114	11-5-73	51375	C. P. S. B.	1971	IHC	392	V8	6-auto	25,500	Const.	35,451	159	1.65	1329	1257	114
115	11-5-73	51363	C. P. S. B.	1971	IHC	392	V8	6-auto	25,500	Const.	38,578	259	2.69	1496	1415	115
116	11-9-73	4364	Elmore	1970	GMC	350	V8	4	14,000	Moving	15,767	1851	1.72	1997	1945	116
117	11-8-73	16	Elmore	1970	GMC	350	V8	4	14,000	Moving	13,232	250	1.14	2557	2567	117
118	11-6-73	043247	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Mail	18,096	235	2.02	1369	1393	118
119	11-6-73	043144	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Mail	25,813	295	2.22	1438	1464	119
120	11-7-73	043327	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Mail	20,763	255	2.12	1032	1067	120
121	11-13-73	98	Facs	1970	GMC	292	6	4	10,000	Delivery	47,708	266	4.62	1328	1333	121
122	11-13-73	101	Facs	1970	GMC	292	6	4	10,000	Delivery	41,422	225	1.94	2733	2744	122
123	11-14-73	102	Facs	1970	GMC	292	6	4	10,000	Delivery	52,677	172	1.77	1422	1406	123
124	11-14-73	105	Facs	1970	GMC	292	6	4	10,000	Delivery	20,125	323	2.55	1114	1134	124
125	11-6-73	043221	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Delivery	20,125	323	2.55	1114	1134	125
126		042519	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Delivery	14,993	228	2.23	928	960	126
127	11-17-73	1085	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	20,500	297	3.83	1562	1651	127
128	11-17-73	1086	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	35,447	266	1.49	2792	2951	128
129	11-17-73	1088	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	33,802	324	2.65	2267	2396	129
130		1353	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	Converted to LPG					130
131		1347	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	27,876	281	4.04	1637	1310	131
132		1355	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	27,642	510	8.36	459	367	132
133		1340	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	Converted to LPG					133
134		1348	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	29,435	183	4.97	622	523	134
135		1345	S. A. P. W.	1971	IHC	392	V6	6-auto	34,000	Garbage	Converted to LPG					135
136		1319	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	26,009	302	6.69	552	442	136
137	11-27-73	1365	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	25,316	308	3.82	1639	1328	137
138		1346	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	29,185	269	2.58	1998	1660	138
139		1364	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	28,110	323	7.68	384	319	139
140		1363	S. A. P. W.	1971	IHC	392	V8	6-auto	34,000	Garbage	29,048	277	4.96	906	725	140
141	11-17-73	1087	Lone Star	1971	Ford	391	V8	5	27,500	Delivery	31,293	293	3.44	1629	1722	141
142		496	ABC	1971	IHC	478	V8	5	32,000	Tractor	Over 50,000 miles					142
143		497	ABC	1971	IHC	478	V8	5	32,000		Over 50,000 miles					143
144		503	ABC	1971	IHC	478	V8	5	32,000		Over 50,000 miles					144
145		3	JFC	1971	Chev	350	V8	4	24,000	Delivery	48,908	166	0.75	1980	1584	145
146		1	JFC	1971	Chev	350	V8	4	24,000	Delivery	54,446	290	6.08	625	500	146
147		5	JFC	1971	Chev	350	V8	4	24,000	Delivery	50,514	162	1.57	1285	1094	147
148		2	JFC	1971	Chev	350	V8	4	24,000	Delivery	Over 50,000 miles					148
149		7	JFC	1971	Chev	350	V8	4	24,000	Delivery	55,175	240	1.97	981	867	149
150		4	JFC	1971	Chev	350	V8	4	24,000	Delivery	43,163	186	1.14	1798	1530	150
151		276-15T	So. Moving	1971	Chev	427	V8	4	32,500	Tractor	71,913	393	4.40	659	647	151
152		6	JFC	1971	Chev	350	V6	4	24,000	Delivery	48,463	153	1.03	2036	1629	152

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*Hi-lo means two-speed rear axle.

TABLE D-8. ROUND 1 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - HYDROCARBONS

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet&GMC	427	V8	2	151	63	238	124
White	400	6	5	154	96	189	38
Ford	302	V8	1	164	-	-	-
Ford	300	6	17	177	132	223	26
Chevrolet	366	V8	2	177	170	184	10
GMC	350	V8	2	189	154	223	49
Dodge	225	6	8	206	181	255	25
Chevrolet	292	6	2	209	173	244	50
GMC	292	6	5	217	170	254	41
GMC	401	V6	1	229	-	-	-
Ford	360	V8	5	232	209	260	18
Chevrolet	350	V8	7	241	84	362	94
IHC	392	V8	23	246	148	310	43
Dodge	318	V8	15	247	173	328	43
Chevrolet	307	V8	11	257	158	615	129
Ford	240	6	3	261	261	262	1
Chevrolet	250	6	4	263	249	273	10
Ford	391	V8	4	264	189	317	54
IHC	345	V8	8	273	230	345	37
IHC	478	V8	7	275	229	307	29
Ford	361	V8	3	279	232	322	45
IHC	304	V8	13	297	252	352	37
Ford	330	V8	4	315	253	407	68

TABLE D-9. ROUND 1 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CARBON MONOXIDE

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Ford	300	6	17	0.57	0.26	0.83	0.18
Ford	240	6	3	1.00	0.45	1.62	0.59
Chevrolet	292	6	2	1.02	0.89	1.15	0.18
Ford	391	V8	4	1.07	0.54	1.70	0.56
Ford	302	V8	1	1.07	-	-	-
Chevrolet	366	V8	2	1.15	1.14	1.16	0.01
Chevrolet	350	V8	7	1.16	0.88	1.71	0.28
IHC	345	V8	8	1.18	0.89	1.57	0.21
IHC	304	V8	13	1.30	0.78	2.24	0.37
GMC	292	6	5	1.37	0.86	2.27	0.55
Chevrolet	250	6	4	1.40	1.19	1.69	0.22
Chevrolet&GMC	427	V8	2	1.42	1.32	1.52	0.14
Ford	361	V8	3	1.45	1.18	1.76	0.29
IHC	478	V8	7	1.57	1.15	1.88	0.29
Dodge	225	6	8	1.78	1.57	2.13	0.20
Ford	360	V8	5	1.79	1.20	2.06	0.34
Dodge	318	V8	15	1.96	1.44	2.69	0.38
GMC	401	V6	1	2.04	-	-	-
GMC	350	V8	2	2.05	0.47	3.62	2.23
Ford	330	V8	4	2.10	0.71	5.51	2.28
Chevrolet	307	V8	11	2.33	1.61	3.79	0.67
IHC	392	V8	23	2.28	1.10	4.24	0.60
White	400	6	5	2.49	1.46	4.49	1.18

TABLE D-10. ROUND 1 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - OBSERVED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	882	481	1282	566
Chevrolet&GMC	427	V8	2	909	593	1224	466
IHC	392	V8	23	1059	423	2346	396
Chevrolet	350	V8	7	1187	979	1384	156
Dodge	318	V8	15	1457	656	2519	563
GMC	350	V8	2	1575	1311	1839	373
IHC	478	V8	7	1662	1419	2148	254
White	400	6	5	1742	1213	2221	369
GMC	401	V6	1	1760	-	-	-
Ford	360	V8	5	1783	1419	2052	254
Ford	302	V8	1	1795	-	-	-
Ford	361	V8	3	1943	1658	2212	277
Chevrolet	307	V8	11	1962	1102	2655	491
GMC	292	6	5	2059	1140	3241	917
Ford	240	6	3	2036	1853	2356	278
IHC	345	V8	8	2118	1585	2477	295
IHC	304	V8	13	2146	1784	2916	313
Dodge	225	6	8	2162	1651	2452	234
Ford	391	V8	4	2201	1410	3068	696
Chevrolet	292	6	2	2203	2184	2222	27
Ford	300	6	17	2272	1112	3984	690
Chevrolet	250	6	4	2333	2189	2462	111
Ford	330	V8	4	2430	806	3025	1084

TABLE D-11. ROUND 1 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CORRECTED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	712	390	1033	454
Chevrolet&GMC	427	V8	2	945	600	1290	488
IHC	392	V8	23	1040	378	2276	385
Chevrolet	350	V8	7	1238	1022	1432	159
Dodge	318	V8	15	1306	552	2308	527
GMC	350	V8	2	1568	1302	1834	376
GMC	401	V6	1	1656	-	-	-
White	400	6	5	1683	1316	2387	450
Ford	360	V8	5	1698	1497	1981	181
IHC	478	V8	7	1713	1474	2187	237
Chevrolet	307	V8	11	1767	1150	2384	361
Ford	361	V8	3	1785	1540	2093	282
Ford	302	V8	1	1803	-	-	-
GMC	292	6	5	1856	998	2803	770
Ford	391	V8	4	1925	1340	2424	461
IHC	304	V3	13	1932	1612	2363	226
Dodge	225	6	8	2076	1512	2599	318
Ford	240	6	3	2050	1840	2445	343
Ford	300	6	17	2186	1065	3957	708
IHC	345	V8	8	2168	1671	2572	306
Chevrolet	292	6	2	2238	2193	2284	64
Chevrolet	250	6	4	2358	2228	2455	101
Ford	330	V8	4	2376	801	3188	1098

TABLE D-12. ROUND 2 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - HYDROCARBONS

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	163	139	186	33
GMC	350	V8	2	203	197	208	8
Ford	300	6	17	204	150	262	31
White	400	6	5	213	174	249	27
Chevrolet	292	6	2	233	208	257	35
Ford	302	V8	1	236	-	-	-
Chevrolet&GMC	427	V8	2	239	236	242	4
Ford	391	V8	4	255	202	314	48
Chevrolet	307	V8	11	255	192	369	48
IHC	345	V8	8	260	190	282	30
GMC	292	6	5	262	198	317	47
Dodge	225	6	8	262	230	319	29
IHC	478	V8	7	264	182	399	67
IHC	304	V8	13	267	206	325	36
Chevrolet	350	V8	7	274	196	420	85
IHC	392	V8	23	280	187	375	45
Chevrolet	250	6	4	281	260	294	15
Dodge	318	V8	15	282	207	341	42
Ford	360	V8	5	290	274	304	12
Ford	240	6	3	311	261	344	44
GMC	401	V6	1	329	-	-	-
Ford	361	V8	3	334	293	377	42
Ford	330	V8	4	349	300	388	37

TABLE D-13. ROUND 2 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CARBON MONOXIDE

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Ford	300	6	17	0.54	0.31	1.04	0.19
Chevrolet	292	6	2	0.86	0.84	0.88	0.03
Ford	330	V8	4	0.87	0.52	1.22	0.29
Chevrolet	366	V8	2	0.94	0.76	1.11	0.25
GMC	350	V8	2	1.03	0.65	1.40	0.53
Ford	302	V8	1	1.03	-	-	-
Ford	240	6	3	1.07	0.54	1.54	0.50
IHC	345	V8	8	1.11	0.81	1.61	0.23
Chevrolet	250	6	4	1.16	0.94	1.45	0.24
GMC	292	6	5	1.34	0.56	1.99	0.55
IHC	304	V8	13	1.45	1.07	2.60	0.38
IHC	478	V8	7	1.54	0.87	1.82	0.31
Ford	391	V8	4	1.59	0.77	2.74	0.87
Ford	361	V8	3	1.82	1.41	2.12	0.37
Dodge	225	6	8	1.84	1.53	2.40	0.27
Dodge	318	V8	15	1.86	1.40	2.42	0.28
Chevrolet	350	V8	7	1.89	1.09	2.55	0.48
Ford	360	V8	5	2.20	1.73	2.55	0.30
White	400	6	5	2.35	0.94	3.81	1.03
Chevrolet&GMC	427	V8	2	2.39	2.18	2.59	0.29
Chevrolet	307	V8	11	2.55	1.91	3.39	0.45
IHC	392	V8	23	2.63	1.71	6.56	1.00
GMC	401	V6	1	4.75	-	-	-

TABLE D-14. ROUND 2 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - OBSERVED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	784	483	1084	425
GMC	401	V6	1	855	-	-	-
Chevrolet&GMC	427	V8	2	1158	927	1389	327
Chevrolet	350	V8	7	1312	996	1729	261
IHC	392	V8	23	1403	434	2173	431
Dodge	318	V8	15	1591	948	2457	405
IHC	478	V8	7	1630	1312	2289	387
Ford	360	V8	5	1750	1451	2172	277
White	400	6	5	1838	1512	2241	306
Chevrolet	307	V8	11	1838	1199	2336	314
GMC	350	V8	2	1854	1807	1900	66
Ford	361	V8	3	1867	1651	2088	219
Ford	240	6	3	1936	1703	2241	276
Ford	302	V8	1	2001	-	-	-
IHC	304	V8	13	2121	1257	2711	371
GMC	292	6	5	2200	1221	3136	695
Ford	300	6	17	2262	1075	3488	736
Ford	391	V8	4	2287	1947	2638	321
Dodge	225	6	8	2308	2117	2479	125
IHC	345	V8	8	2321	1897	2770	293
Chevrolet	292	6	2	2539	2499	2579	57
Chevrolet	250	6	4	2663	2628	2732	48
Ford	330	V8	4	2953	2734	3331	283

TABLE D-15. ROUND 2 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CORRECTED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	815	483	1146	469
GMC	401	V6	1	858	-	-	-
Chevrolet&GMC	427	V8	2	1155	921	1386	331
Chevrolet	350	V8	7	1323	989	1677	259
IHC	392	V8	23	1431	429	2173	438
Dodge	318	V8	15	1603	881	2550	425
IHC	478	V8	7	1611	1246	2346	382
Ford	360	V8	5	1735	1481	2131	260
White	400	6	5	1741	1458	2079	270
Chevrolet	307	V8	11	1891	1260	2504	325
GMC	350	V8	2	1902	1845	1959	81
Ford	240	6	3	1939	1734	2184	228
Ford	361	V8	3	1965	1745	2194	225
Ford	302	V8	1	2009	-	-	-
IHC	304	V8	13	2117	1233	2683	391
Ford	300	6	17	2162	980	3314	675
GMC	292	6	5	2217	1226	3114	688
Ford	391	V8	4	2322	1947	2693	368
IHC	345	V8	8	2332	1958	2663	292
Chevrolet	250	6	4	2338	2218	2445	100
Dodge	225	6	8	2354	2161	2548	122
Chevrolet	292	6	2	2487	2394	2579	131
Ford	330	V8	4	2950	2686	3268	266

TABLE D-16.ROUND 3 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - HYDROCARBONS (PPM HEX.)

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	126	115	137	16
GMC	292	6	5	172	95	219	47
GMC	350	V8	2	177	139	215	54
Ford	300	6	14	179	102	251	42
Chevrolet	292	6	2	191	170	212	30
White	400	6	5	205	140	306	68
Dodge	225	6	8	205	182	245	25
Ford	302	V8	1	214	-	-	-
Ford	360	V8	5	231	163	274	43
IHC	304	V8	13	238	198	273	25
Ford	391	V8	4	253	190	316	61
Chevrolet	307	V8	10	253	185	426	74
Chevrolet	350	V8	7	255	167	364	69
IHC	345	V8	8	256	193	339	46
Chevrolet	250	6	4	259	222	293	34
Ford	240	6	3	281	274	289	8
IHC	478	V8	7	288	231	506	99
IHC	392	V8	23	294	185	539	85
Dodge	318	V8	15	294	221	378	43
Ford	361	V8	3	309	305	312	4
GMC	401	V6	1	312	-	-	-
Ford	330	V8	4	337	278	406	60
Chevrolet&GMC	427	V8	2	1042	245	1838	1126

TABLE D-17. ROUND 3 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CARBON MONOXIDE (PERCENT)

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	292	6	2	0.89	0.84	0.93	0.06
Ford	300	6	14	1.10	0.19	4.55	1.28
GMC	292	6	5	1.12	0.63	1.91	0.53
IHC	345	V8	8	1.20	0.92	1.52	0.21
IHC	304	V8	13	1.39	0.86	2.14	0.36
GMC	350	V8	2	1.45	1.07	1.83	0.54
Chevrolet	250	6	4	1.47	1.09	1.84	0.31
Ford	391	V8	4	1.50	0.72	2.41	0.83
Chevrolet	366	V8	2	1.50	1.18	1.81	0.45
Ford	330	V8	4	1.52	0.83	3.05	1.05
Ford	302	V8	1	1.67	-	-	-
IHC	478	V8	7	1.69	1.28	2.78	0.52
Chevrolet	350	V8	7	1.74	1.06	2.49	0.53
Dodge	318	V8	15	1.77	1.39	2.24	0.24
Dodge	225	6	8	1.89	1.60	2.19	0.21
Ford	361	V8	3	2.11	1.54	2.41	0.49
Ford	360	V8	5	2.24	1.76	2.50	0.28
Ford	240	6	3	2.32	0.85	3.41	1.32
Chevrolet	307	V8	10	2.56	1.97	3.1	0.38
IHC	392	V8	23	2.76	1.38	11.92	2.11
Chevrolet&GMC	427	V8	2	2.88	2.07	3.68	1.14
White	400	6	5	2.89	1.67	4.23	1.02
GMC	401	V6	1	5.07	-	-	-

TABLE D-18. ROUND 3 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - OBSERVED NITRIC OXIDE (PPM)

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet & GMC	427	V8	2	695	627	763	96
GMC	401	V6	1	899	-	-	-
Chevrolet	366	V8	2	948	775	1121	245
Chevrolet	350	V8	7	1458	1010	1829	268
Ford	240	6	3	1515	1106	2258	645
IHC	392	V8	23	1585	272	2233	498
Dodge	318	V8	15	1744	805	2632	439
IHC	478	V8	7	1756	1325	2414	363
Ford	360	V8	5	1761	1521	1913	155
White	400	6	5	1766	717	2515	682
Chevrolet	307	V8	10	1866	1642	2425	228
Ford	361	V8	3	1873	1786	1929	76
Ford	302	V8	1	1956	-	-	-
GMC	350	V8	2	1988	1896	2080	130
IHC	345	V8	8	2219	1939	2461	166
Ford	300	6	14	2293	1140	3811	837
Ford	391	V8	4	2306	1954	2655	384
Dodge	225	6	8	2326	1912	2755	265
IHC	304	V8	13	2353	1771	2884	344
Chevrolet	250	6	4	2400	2295	2492	103
GMC	292	6	5	2422	1280	3445	770
Ford	330	V8	4	2582	1883	2973	511
Chevrolet	292	6	2	2586	2452	2719	189

TABLE D-19. ROUND 3 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CORRECTED NITRIC OXIDE (PPM)

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet&GMC	427	V8	2	687	625	749	87.7
Chevrolet	366	V8	2	885	784	985	142.1
GMC	401	V6	1	899	-	-	-
Chevrolet	350	V8	7	1377	884	1599	249.7
Ford	240	6	3	1496	1110	2242	646.2
IHC	392	V8	23	1538	266	2332	482.4
IHC	478	V8	7	1669	1353	2202	301.4
Dodge	318	V8	15	1671	799	2521	425.1
Ford	360	V8	5	1743	1504	1934	161.8
White	400	6	5	1773	720	2543	688.2
GMC	350	V8	2	1865	1816	1914	69.3
Chevrolet	307	V8	10	1879	1532	2333	214.3
Ford	361	V8	3	1888	1859	1915	28.1
Ford	391	V8	4	1952	1680	2206	293.1
Ford	302	V8	1	1956	-	-	-
Ford	300	6	14	2285	1168	3879	825.2
IHC	345	V8	8	2310	2066	2616	204.5
Dodge	225	6	8	2346	1946	2628	245.9
IHC	304	V8	13	2373	1790	2843	316.7
Chevrolet	250	6	4	2378	2279	2475	101.8
GMC	292	6	5	2386	1226	3672	871.0
Chevrolet	292	6	2	2582	2435	2730	208.6
Ford	330	V8	4	2586	1827	3006	546.8

TABLE D-20. ROUND 4 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - HYDROCARBONS (PPM HEX.)

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	152	121	182	62
Ford	300	6	14	192	120	272	40
GMC	350	V8	2	196	181	211	21
Chevrolet	350	V8	7	200	121	290	62
GMC	292	6	5	200	125	291	65
White	400	6	5	202	129	311	74
Chevrolet	292	6	2	202	179	225	33
Chevrolet	307	V8	10	207	161	259	11
Chevrolet&GMC	427	V8	2	232	231	232	1
Ford	302	V8	1	235	-	-	-
Dodge	225	6	8	238	175	300	44
IHC	304	V8	13	242	166	324	34
IHC	345	V8	8	248	186	302	42
Ford	240	6	3	250	211	288	54
Ford	360	V8	5	251	237	272	13
Chevrolet	250	6	4	251	223	272	20
IHC	392	V8	21	266	177	483	66
Ford	391	V8	4	281	224	340	65
Dodge	318	V8	15	288	212	355	49
GMC	401	V6	1	298	-	-	-
Ford	361	V8	3	399	282	586	164
IHC	478	V8	7	572	153	1922	614
Ford	330	V8	4	811	253	2093	860

TABLE D-21. ROUND 4 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CARBON MONOXIDE (PERCENT)

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Ford	302	V8	1	0.97	-	-	-
Ford	300	6	14	1.01	0.15	4.78	1.33
Chevrolet	292	6	2	1.02	0.84	1.19	0.25
GMC	292	6	5	1.14	0.51	1.96	0.64
Chevrolet	366	V8	2	1.21	0.75	1.66	0.55
Chevrolet	250	6	4	1.23	0.68	1.8	0.48
IHC	345	V8	8	1.30	0.91	1.62	0.22
IHC	304	V8	13	1.34	0.86	2.24	0.39
IHC	478	V8	7	1.48	0.80	1.97	0.44
Chevrolet	350	V8	7	1.56	0.87	2.37	0.55
Ford	330	V8	4	1.71	0.73	3.89	1.49
GMC	350	V8	2	1.82	1.33	2.30	0.69
Dodge	318	V8	15	1.83	1.45	2.23	0.25
Ford	240	6	3	1.85	1.82	1.87	0.04
Ford	361	V8	3	1.87	1.55	2.48	0.53
Ford	391	V8	4	1.93	0.74	3.36	1.29
Dodge	225	6	8	1.96	1.44	2.17	0.26
Ford	360	V8	5	2.24	1.55	2.90	0.52
Chevrolet&GMC	427	V8	2	2.34	1.82	2.85	0.73
IHC	392	V8	21	2.38	1.65	3.96	0.55
Chevrolet	307	V8	10	2.55	1.94	3.24	0.13
White	400	6	5	2.64	1.44	3.35	0.73
GMC	401	V6	1	4.90	-	-	-

TABLE D-22. ROUND 4 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - OBSERVED NITRIC OXIDE (PPM)

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	690	439	941	185
GMC	401	V6	1	904	-	-	-
Chevrolet&GMC	427	V8	2	1020	591	1448	606
Chevrolet	350	V8	7	1118	844	1438	185
IHC	392	V8	21	1397	717	2143	368
IHC	478	V8	7	1404	1035	1755	260
GMC	350	V8	2	1498	1437	1559	86
Ford	240	6	3	1627	1088	2165	762
Dodge	318	V8	15	1634	946	2408	396
Ford	360	V8	5	1659	1537	1853	128
Chevrolet	307	V8	10	1730	1071	2328	109
Ford	361	V8	3	1816	1120	2364	635
White	400	6	5	1850	1484	2363	355
Ford	391	V8	4	1932	1438	2302	435
Ford	330	V8	4	2047	1553	2780	529
Dodge	225	6	8	2100	1454	2565	347
IHC	304	V8	13	2377	1492	2950	505
IHC	345	V8	8	2429	1829	2862	335
GMC	292	6	5	2456	1064	3681	1298
Ford	302	V8	1	2469	-	-	-
Ford	300	6	14	2478	1256	4008	849
Chevrolet	250	6	4	2608	2026	3134	228
Chevrolet	292	6	2	2659	2635	2683	34

TABLE D-23. ROUND 4 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CORRECTED NITRIC OXIDE (PPM)

Manufacturer	CID	Cyl.	Number In Group	Mean	Min	Max	Standard Deviation
Chevrolet	366	V8	2	628	378	878	189
GMC	401	V6	1	795	-	-	-
Chevrolet&GMC	427	V8	2	981	591	1370	550
Chevrolet	350	V8	7	1142	819	1415	189
IHC	478	V8	7	1274	1011	1517	175
IHC	392	V8	21	1300	720	1865	324
Ford	240	6	3	1301	870	1732	610
Ford	360	V8	5	1478	1371	1629	109
Dodge	318	V8	15	1509	918	2072	311
GMC	350	V8	2	1517	1421	1613	136
White	400	6	5	1521	1140	1928	306
Chevrolet	307	V8	10	1578	1071	1969	86
Ford	361	V8	3	1599	1054	2090	520
Ford	391	V8	4	1910	1411	2269	425
Ford	330	V8	4	1944	1267	2727	607
IHC	345	V8	8	2008	1648	2274	228
Dodge	225	6	8	2034	1460	2447	342
IHC	304	V8	13	2138	1482	2582	373
Chevrolet	250	6	4	2145	1653	2698	214
Ford	302	V8	1	2262	-	-	-
Ford	300	6	14	2293	1150	3172	780
GMC	292	6	5	2307	1001	3696	1164
Chevrolet	292	6	2	2455	2385	2524	98

TABLE D-24. ROUND 5 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - HYDROCARBONS

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
Chevrolet	366	V8	2	160	139	180	29
Chevrolet	427	V8	1	193	---	----	----
GMC	350	V8	2	208	192	223	22
White	400	6	5	208	117	298	66
Ford	300	6	14	212	137	314	56
Dodge	225	6	8	227	106	297	35
IHC	478	V8	7	228	165	273	36
Chevrolet	250	6	4	249	210	288	55
Ford	302	V8	1	252	---	----	----
GMC	401	V6	1	252	---	----	----
IHC	345	V8	8	262	142	439	97
IHC	392	V8	21	263	119	696	116
Chevrolet	292	6	2	269	214	371	71
Dodge	318	V8	15	282	218	485	69
Ford	360	V8	5	285	171	476	115
Chevrolet	350	V8	7	294	206	547	119
GMC	292	6	1	316	---	----	----
Ford	240	6	3	321	304	347	23
Ford	330	V8	4	351	268	531	121
Ford	391	V8	4	375	229	604	160
IHC	304	V8	13	380	189	2031	498
Ford	361	V8	3	386	256	566	161
Chevrolet	307	V8	9	841	174	3906	1313

TABLE D-25. ROUND 5 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CARBON MONOXIDE

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
GMC	292	6	1	0.64	----	----	----
Chevrolet	250	6	4	0.90	0.88	0.92	0.03
Ford	302	V8	1	0.98	----	----	----
Ford	300	6	14	1.01	0.22	4.80	1.31
IHC	345	V8	8	1.39	2.07	2.07	0.38
Chevrolet	366	V8	2	1.40	1.00	1.79	0.56
IHC	304	V8	13	1.45	0.72	2.20	0.37
Chevrolet	292	6	2	1.47	1.08	2.09	0.46
Chevrolet	427	V8	1	1.56	----	----	----
IHC	478	V8	7	1.82	1.04	2.63	0.64
Ford	330	V8	4	1.82	0.67	4.46	1.78
Dodge	318	V8	15	1.85	1.36	2.43	0.33
Chevrolet	350	V8	7	1.96	1.28	2.94	0.67
Dodge	225	6	8	1.97	0.39	1.76	0.14
Ford	391	V8	4	2.01	0.56	3.95	1.56
Ford	361	V8	3	2.11	1.50	2.46	0.53
Chevrolet	307	V8	9	2.43	1.86	3.00	0.44
Ford	360	V8	5	2.51	1.74	3.28	0.64
Ford	240	6	3	2.55	2.45	2.63	0.09
GMC	350	V8	2	2.57	2.14	2.99	0.60
White	400	6	5	2.63	1.61	3.80	0.86
IHC	392	V8	21	2.76	1.34	7.07	1.34
GMC	401	V6	1	5.03	----	----	----

TABLE D-26. ROUND 5 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - OBSERVED NITRIC OXIDE

Manufacturer	CID	Cyi.	Number in Group	Mean	Min.	Max.	Standard Deviation
Chevrolet	366	V8	2	913	701	1125	300
GMC	401	V6	1	1162	----	----	---
GMC	350	V8	2	1303	1680	1680	533
Ford	240	6	3	1467	1215	1827	320
Chevrolet	350	V8	7	1500	468	2279	597
Dodge	318	V8	15	1518	603	2366	494
Ford	360	V8	5	1519	1198	1698	196
IHC	392	V8	21	1559	428	2948	598
IHC	478	V8	7	1659	1344	2040	290
Chevrolet	307	V8	9	1680	923	2217	407
White	400	6	5	1753	1101	2393	538
Ford	361	V8	3	1945	1623	2258	318
Dodge	225	6	8	1990	1089	1352	387
IHC	345	V8	8	2144	2779	2779	488
IHC	304	V8	13	2242	1761	2786	328
Chevrolet	292	6	2	2266	1917	2740	357
Ford	330	V8	4	2304	837	3129	999
Chevrolet	427	V8	1	2308	----	----	---
Ford	391	V8	4	2324	1572	2824	540
Ford	300	6	14	2487	978	4047	869
Ford	302	V8	1	2501	----	----	---
Chevrolet	250	6	4	2645	2217	3073	605
GMC	292	6	1	3337	----	----	---

TABLE D-27. ROUND 5 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CORRECTED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
Chevrolet	366	V8	2	953	732	1175	313
GMC	401	V6	1	1027	----	----	----
GMC	350	V8	2	1143	1361	1361	308
Chevrolet	350	V8	7	1224	374	1860	484
Ford	240	6	3	1373	1117	1772	350
Dodge	318	V8	15	1458	633	2357	503
IHC	392	V8	21	1488	433	2518	515
Ford	360	V8	5	1525	1194	1750	214
Chevrolet	307	V8	9	1550	820	1970	375
IHC	478	V8	7	1577	1087	1837	269
White	400	6	5	1720	1092	2321	519
Ford	361	V8	3	1862	1623	2125	252
Chevrolet	427	V8	1	1895	----	----	----
Dodge	225	6	8	1933	1114	1337	363
Ford	391	V8	4	2065	1397	2510	479
IHC	345	V8	8	2145	2827	2827	528
IHC	304	V8	13	2220	1649	2755	382
Chevrolet	292	6	2	2266	1925	2721	347
Ford	330	V8	4	2287	803	3129	1033
Ford	302	V8	1	2473	----	----	----
Ford	300	6	14	2473	1003	3940	847
Chevrolet	250	6	4	2520	2201	2840	452
GMC	292	6	1	3249	----	----	----

TABLE D-28. ROUND 6 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - HYDROCARBONS

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
GMC	350	V8	1	174	-	-	-
White	400	I6	5	182	154	237	33
Ford	300	I6	12	192	131	253	39
Chevrolet	366	V8	2	193	184	202	13
Chevrolet	292	I6	2	201	150	252	72
GMC	292	I6	3	203	104	265	86
Ford	302	V8	1	235	-	-	-
Dodge	225	I6	8	237	187	328	45
IHC	345	V8	8	238	172	343	55
Chevrolet	250	I6	4	255	228	295	32
Ford	360	V8	5	256	164	335	66
Ford	240	I6	3	275	205	318	61
Ford	361	V8	3	299	242	364	61
IHC	478	V8	6	315	173	417	79
IHC	304	V8	13	322	192	742	181
Ford	330	V8	4	336	213	547	146
GMC	401	V6	1	346	-	-	-
IHC	392	V8	21	383	182	2062	393
Chevrolet	350	V8	7	408	246	892	217
Ford	391	V8	4	448	240	845	272
Dodge	318	V8	15	537	225	2857	713
Chevrolet	307	V8	9	626	170	2082	805
Chevrolet	427	V8	1	(Not Available for Test)			

TABLE D-29. ROUND 6 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CARBON MONOXIDE

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
Ford	300	I6	12	.851	0.35	3.65	0.919
Chevrolet	292	I6	2	.875	0.58	1.17	0.417
Ford	302	V8	1	1.05	-	-	-
GMC	350	V8	1	1.18	-	-	-
IHC	345	V8	8	1.48	0.99	2.15	0.388
Chevrolet	250	I6	4	1.55	1.08	2.02	0.384
Chevrolet	366	V8	2	1.72	1.25	2.19	0.665
IHC	304	V8	13	1.79	1.18	2.26	0.335
Ford	240	I6	3	1.81	0.65	2.42	1.010
Dodge	318	V8	15	1.93	1.51	2.44	0.260
Ford	330	V8	4	2.02	0.88	4.57	1.720
IHC	478	V8	6	2.12	1.06	2.77	0.671
Chevrolet	350	V8	7	2.13	1.49	3.63	0.744
Dodge	225	I6	8	2.13	1.82	2.53	0.221
GMC	292	I6	3	2.33	0.80	4.63	2.020
Ford	361	V8	3	2.38	1.69	2.79	0.599
Ford	391	V8	4	2.58	1.48	4.53	1.440
Chevrolet	307	V8	9	2.62	2.03	3.25	0.388
White	400	I6	5	2.78	1.52	3.95	0.904
Ford	360	V8	5	2.85	2.04	3.37	0.554
IHC	392	V8	21	3.23	1.31	8.23	1.870
GMC	401	V6	1	5.60	-	-	-
Chevrolet	427	V8	1	(Not Available for Test)			

TABLE D-30. ROUND 6 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - OBSERVED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
Chevrolet	366	V8	2	650	406	894	345
GMC	401	V6	1	1097	-	-	-
IHC	478	V8	6	1361	957	2373	521
IHC	392	V8	21	1458	317	2333	588
Chevrolet	307	V8	9	1497	559	2195	543
Ford	360	V8	5	1513	1053	1886	322
Chevrolet	350	V8	7	1563	823	2646	738
GMC	292	I6	3	1625	1045	2692	925
Ford	240	I6	3	1627	1364	1909	273
GMC	350	V8	1	1634	-	-	-
Dodge	318	V8	15	1756	1223	2687	409
White	400	I6	5	1848	1170	2323	429
Ford	361	V8	3	1949	1504	2425	461
IHC	304	V8	13	2091	1453	2889	470
Ford	391	V8	4	2100	1379	2639	601
IHC	345	V8	8	2105	1606	2752	449
Ford	330	V8	4	2152	1032	2968	859
Dodge	225	I6	8	2215	1874	2494	195
Ford	302	V8	1	2216	-	-	-
Chevrolet	250	I6	4	2597	2118	2951	404
Ford	300	I6	12	2982	2186	3667	444
Chevrolet	292	I6	2	3033	2885	3180	209
Chevrolet	427	V8	1	(Not Available for Test)			

TABLE D-31. ROUND 6 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CORRECTED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
Chevrolet	366	V8	2	625	389	860	333
GMC	401	V6	1	1076	-	-	-
IHC	392	V8	21	1229	285	2124	522
IHC	478	V8	6	1319	905	2382	561
Chevrolet	307	V8	9	1337	591	2153	472
Ford	360	V8	5	1408	1119	1641	187
Chevrolet	350	V8	7	1543	838	2657	763
Dodge	318	V8	15	1561	979	2426	459
Ford	240	I6	3	1572	1295	1894	302
GMC	350	V8	1	1641	-	-	-
GMC	292	I6	3	1675	1111	2777	954
White	400	I6	5	1725	984	2225	462
Ford	302	V8	1	1761	-	-	-
Ford	361	V8	3	1801	1440	2212	388
Dodge	225	I6	8	1937	1491	2435	330
IHC	345	V8	8	1949	1606	2413	318
IHC	304	V8	13	1971	1294	2646	445
Ford	391	V8	4	2050	1274	2645	651
Ford	330	V8	4	2125	980	2946	872
Chevrolet	250	I6	4	2336	1853	2623	357
Chevrolet	292	I6	2	2541	2537	2544	5
Ford	300	I6	12	2625	2040	3311	384
Chevrolet	427	V8	1	(Not Available for Test)			

TABLE D-32. ROUND 7 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - HYDROCARBONS

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
GMC	292	I6	4	199	134	266	58.08
Chevrolet	350	V8	6	200	153	290	54.23
Chevrolet	366	V8	2	212	143	280	96.87
Chevrolet	292	I6	2	227	202	251	34.65
Ford	300	I6	11	236	155	306	41.32
Ford	302	V8	1	256	-	-	-
Dodge	225	I6	8	257	199	289	36.60
Ford	361	V8	3	265	220	312	46.03
IHC	392	V8	20	268	138	510	83.86
White	400	I6	5	286	228	352	47.90
Ford	360	V8	5	290	249	310	25.63
Chevrolet	250	I6	3	292	277	308	15.57
GMC	401	V6	1	292	-	-	-
Ford	391	V8	4	295	266	324	23.73
IHC	304	V8	12	295	240	501	78.21
Ford	240	I6	2	304	280	328	33.94
Ford	330	V8	4	378	260	602	152.9
Chevrolet	427	V8	1	393	-	-	-
Dodge	318	V8	14	431	210	2106	485.8
IHC	345	V8	5	621	164	2016	783.0
Chevrolet	307	V8	9	652	205	2151	801.2
IHC	478	V8	3	930	220	1901	870.2
GMC	350	V8	2	1051	250	1851	1132

TABLE D-33. ROUND 7 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CORRECTED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
Chevrolet	427	V8	1	647	-	-	-
Chevrolet	366	V8	2	841	617	1065	316.8
IHC	392	V8	20	946	300	1931	466.3
GMC	401	V6	1	994	-	-	-
Chevrolet	350	V8	6	1201	500	1629	458.8
IHC	478	V8	3	1304	1009	1540	270.5
Dodge	318	V8	14	1311	755	2366	424.0
White	400	I6	5	1482	1067	1955	433.1
Ford	361	V8	3	1605	1445	1901	256.4
Ford	360	V8	5	1622	1327	1826	213.5
Chevrolet	307	V8	9	1821	4197	2149	206.1
Ford	240	I6	2	1890	1888	1891	2.12
IHC	304	V8	12	1987	1124	2572	395.3
GMC	292	I6	4	2006	1333	2744	740.0
IHC	345	V8	5	2107	1918	2392	187.0
Dodge	225	I6	8	2145	1780	2567	236.9
Chevrolet	250	I6	3	2154	1940	2372	216.0
Ford	391	V8	4	2180	1651	2951	613.9
GMC	350	V8	2	2256	1945	2567	440.0
Ford	330	V8	4	2386	1235	3058	799.3
Ford	302	V8	1	2430	-	-	-
Chevrolet	292	I6	2	2707	2218	3196	691.6
Ford	300	I6	11	3021	2275	3769	430.8

TABLE D-34. ROUND 7 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - CARBON MONOXIDE

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
Ford	300	I6	11	0.67	0.41	1.13	0.206
Ford	302	V8	1	1.13	-	-	-
GMC	350	V8	2	1.43	1.14	1.72	0.410
Chevrolet	292	I6	2	1.45	0.62	2.28	1.174
IHC	345	V8	5	1.50	1.08	1.90	0.314
Ford	240	I6	2	1.67	1.38	1.96	0.410
Chevrolet	250	I6	3	1.87	1.45	2.08	0.364
IHC	478	V8	3	1.96	1.32	2.74	0.719
Ford	330	V8	4	1.99	0.71	4.87	1.934
IHC	304	V8	12	2.02	1.32	4.96	0.987
Chevrolet	350	V8	6	2.09	0.75	6.08	2.00
Dodge	318	V8	14	2.14	1.63	2.81	0.286
Dodge	225	I6	8	2.18	1.72	2.53	0.291
GMC	292	I6	4	2.33	0.980	4.62	1.585
Ford	361	V8	3	2.62	2.10	2.92	0.452
Chevrolet	307	V8	9	2.74	2.21	3.22	0.348
Ford	391	V8	4	2.85	1.49	3.83	1.033
Ford	360	V8	5	2.98	2.15	3.82	0.695
Chevrolet	366	V8	2	3.37	1.18	5.56	3.097
White	400	I6	5	3.48	1.77	4.42	1.078
IHC	392	V8	20	3.95	1.21	8.36	2.036
Chevrolet	427	V8	1	4.40	-	-	-
GMC	401	V6	1	5.75	-	-	-

TABLE D-35. ROUND 7 AVERAGE EMISSION INSPECTION RESULTS BY ENGINE MODEL - OBSERVED NITRIC OXIDE

Manufacturer	CID	Cyl.	Number in Group	Mean	Min.	Max.	Standard Deviation
Chevrolet	427	V8	1	659	-	-	-
Chevrolet	366	V8	2	816	636	995	253.9
IHC	392	V8	20	1027	294	1998	509.5
GMC	401	V6	1	1136	-	-	-
IHC	478	V8	3	1284	998	1513	262.1
Dodge	318	V8	14	1314	752	2536	458.7
Chevrolet	350	V8	6	1451	578.5	2036	578.5
White	400	I6	5	1478	1067	1928	419.3
Ford	361	V8	3	1646	1490	1938	253.3
Ford	360	V8	5	1650	1313	1909	257.2
Chevrolet	307	V8	9	1838	1543	2243	211.5
Ford	240	I6	2	1973	1971	1974	2.121
GMC	292	I6	4	2013	1328	2733	740.5
IHC	304	V8	12	2022	1060	2652	416.9
Ford	391	V8	4	2063	1562	2792	580.9
IHC	345	V8	5	2079	1879	2291	166.1
Chevrolet	250	I6	3	2085	1876	2294	209.0
GMC	350	V8	2	2277	1997	2557	396.0
Ford	330	V8	4	2282	1289	2885	694.8
Dodge	225	I6	8	2263	1843	2657	301.3
Chevrolet	292	I6	2	2709	2234	3183	671.0
Ford	302	V8	1	2777	-	-	-
Ford	300	I6	11	2953	2230	3576	380.3

TABLE D-36. MEISSION RESULTS FOR VEHICLES REQUIRING TIMING OR IDLE SPEED ADJUSTMENTS HEAVY-DUTY GASOLINE SURVEILLANCE - FOUR MONTHS INSPECTION

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW, lbs	Vehicle Type	Test Miles	Condition	Emission Results				Unit No.
													HC, ppm	CO, %	NO, ppm		
															Obs.	Corr.	
14	5-26-71	24342	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	4,261	As received	239	1.53	1450	1495	14
										Idle speed 150 rpm high		Adjusted	241	1.53	1439	1484	
22	6-14-71	5131	C.P.S.B.	1971	IHC	392	V8	3 auto	25,500	Line	1,499	As received	288	2.77	1137	1157	22
								Timing 14° early,		Idle speed 200 rpm high		Adjusted	290	2.71	651	663	
23	6-11-71	5132	C.P.S.B.	1970	IHC	392	V8	3 auto	25,500	Line	827	As received	365	2.27	1642	1704	23
								Timing 15° early,				Adjusted	296	2.19	871	804	
24	9-7-71	5136	C.P.S.B.	1971	IHC	392	V8	3 auto	25,500	Line	2,958	As received	255	2.08	1493	1493	24
								Timing 5° early				Adjusted	238	2.10	1507	1507	
25	6-19-71	5141	C.P.S.B.	1971	IHC	392	V8	3 auto	25,500	Line	506	As received	261	2.38	879	924	25
										Idle speed 350 rpm high		Adjusted	249	2.37	767	785	
40	6-15-71	8611	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	4,174	As received	212	0.31	3347	3093	40
								Timing 8° early				Adjusted	187	0.29	2770	2599	
43	6-13-71	6856	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	2,848	As received	210	0.70	2572	2366	43
								Timing 6° late				Adjusted	216	0.74	3224	2966	
47	5-17-71	312	C.W.B.	1970	IHC	304	V8	4	19,700	Service	5,616	As received	223	1.27	2195	2114	47
								Timing 6° early				Adjusted	210	1.25	1613	1582	
49	5-20-71	301	C.W.B.	1970	IHC	304	V8	4	10,000	Crew Truck	2,788	As received	264	1.45	2319	2328	49
								Timing 5° early,		Idle speed 100 rpm low		Adjusted	206	1.44	1966	1974	
50	5-20-71	302	C.W.B.	1970	IHC	304	V8	4	10,000	Crew Truck	2,636	As received	267	2.60	1743	1749	50
								Timing 5° early				Adjusted	226	2.55	1457	1463	
57	5-21-71	315	C.W.B.	1970	IHC	304	V8	4	19,700	Service	2,433	As received	295	1.41	2517	2683	57
								Timing 5° early				Adjusted	284	1.54	2333	2487	
58	5-7-71	316	C.W.B.	1970	IHC	304	V8	4	19,700	Service	978	As received	240	1.30	2332	2491	58
								Timing 10° early				Adjusted	195	1.27	1509	1586	
60	5-6-71	253	C.W.B.	1970	Chevrolet	307	V8	4	7,500	Service	1,311	As received	265	3.39	1539	1617	60
								Timing 7° early				Adjusted	246	3.33	1172	1232	
61	5-6-71	254	C.W.B.	1970	Chevrolet	307	V8	4	7,500	Service	3,833	As received	192	2.56	1199	1260	61
								Timing 8° late				Adjusted	261	3.37	1406	1478	
62	5-18-71	391	C.W.B.	1970	Chevrolet	366	V8	5	32,000	Crane	534	As received	186	0.76	1084	1146	62
								Timing 8° early				Adjusted	177	0.63	1041	1100	
74	[illegible]	9195	C.P.S.B.	1970	IHC	392	V8	6	25,500	Line	1,722	As received	309	1.71	1629	1691	74
								Timing 5° early				Adjusted	266	1.67	1609	1646	
80	5-26-71	1029	Lone Star	1970	Chevrolet	307	V8	4	6,600	Delivery	10,511	As received	284	2.98	2336	2504	80
								Timing 6° early				Adjusted	267	2.95	1691	1813	
82	5-27-71	135	Herder	1970	Ford	300	6	5	21,000	Freight	4,736	As received	150	0.65	2521	2579	82
								Timing 8° early				Adjusted	158	0.66	2145	2111	
92	6-2-71	2128	P&R Dept.	1970	Ford	360	V8	4	8,300	Maintenance	2,104	As received	280	1.73	1850	1850	92
								Timing 4° late				Adjusted	275	1.96	1924	1887	
93	6-7-71	27	B.M.W.	1970	Ford	360	V8	4	7,500	Repair	3,482	As received	298	2.23	1680	1648	93
								Timing 4° late				Adjusted	290	2.32	1837	1802	
96	6-12-71	4T1	B.C.R.D.	1970	Ford	240	6	3	7,500	Maintenance	5,392	As received	327	1.13	1703	1734	96
								Timing 6° late				Adjusted	248	0.99	2336	2378	
97	6-11-71	4T16	B.C.R.D.	1970	Ford	240	6	3	7,500	Welder	3,849	As received	344	1.54	1865	1899	97
										Idle speed 250 rpm low		Adjusted	237	1.53	1966	2001	
98	6-11-71	1T22	B.C.R.D.	1970	Ford	330	V8	5	21,000	Water Truck	8,182	As received	300	0.52	3099	3063	98
								Timing 4° early				Adjusted	261	0.52	2517	2562	
99	6-8-71	2T9	B.C.R.D.	1970	Ford	330	V8	4	21,000	Water Truck	4,932	As received	388	0.81	3331	3268	99
								Timing 10° early				Adjusted	252	0.80	2838	2784	
100	6-8-71	2T12	B.C.R.D.	1970	Ford	330	V8	4	21,000	Water Truck	3,572	As received	349	0.91	2738	2686	100
										Idle speed 100 rpm low		Adjusted	304	0.90	2532	2484	
101	6-11-71	4T23	B.C.R.D.	1970	Ford	330	V8	5	21,000	Water Truck	9,154	As received	359	1.22	2734	2783	101
								Timing 10° early,		Idle speed 125 rpm high		Adjusted	319	1.31	2295	2336	
102	6-7-71	7	B.M.W.	1970	Ford	360	V8	4	6,100	Maintenance	4,821	As received	292	2.19	2172	2131	102
								Timing 4° early				Adjusted	269	1.84	1873	1837	
103	6-16-71	36	Southern	1970	GMC	427	V8	5	32,500	Moving	12,371	As received	236	2.18	1389	1389	103
								Timing 4° early,		Idle speed 200 rpm high		Adjusted	274	2.11	1501	1501	
106	6-2-71	2119	P&R Dept.	1970	Ford	360	V8	4	8,300	Maintenance	958	As received	274	2.29	1597	1567	106
										Idle speed 100 rpm low		Adjusted	268	2.33	1619	1588	
111	6-1-71	2082	P&R Dept.	1970	Chevrolet	307	V8	3	7,500	Maintenance	1,909	As received	246	2.41	1797	1889	111
										Idle speed 100 rpm low		Adjusted	241	2.28	1777	1868	
113	6-11-71	51346	C.P.S.B.	1971	IHC	392	V8	6 auto	24,500	Construction	478	As received	329	3.66	920	955	113
								Timing 10° early,		Idle speed 150 rpm high		Adjusted	284	3.40	628	652	
118	6-9-71	043247	P.O.D.	1970	Dodge	318	V8	3 auto	10,900	Mail	2,076	As received	338	1.92	1804	1770	118
										Idle speed 135 rpm low		Adjusted	313	1.99	1798	1758	
122	6-20-71	181	Face	1970	GMC	292	6	4	10,500	Delivery	5,392	As received	317	1.99	2465	2496	122
								Timing 6° early				Adjusted	315	2.11	1890	1930	
125	6-8-71	043221	P.O.D.	1970	Dodge	318	V8	3 auto	10,000	Delivery	2,031	As received	322	2.05	1252	1316	125
										Idle speed 100 rpm high		Adjusted	324	2.26	1261	1325	
134	8-13-71	1348	S.A.P.W.	1971	IHC	392	V8	6 auto	34,700	Garbage	3,348	As received	229	6.56	434	429	134
								Timing 15° early				Adjusted	179	6.59	492	506	

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* Hi-lo means two-speed rear axle.

Unit	Date	Truck		Vehicle		Engine		Trans	GVW	Vehicle	Test	Test	HC,	CO,	NOx ppm		
No.	Tested	No.	Source	Year	Make	CID	Cyl.	Speeds*	lbs.	Type	Miles	Condition	ppm	%	Obs.	Corr.	No.
6	8-20-71	353	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	12,906	As received	306	1.67	2515	2543	6
								Timing 9° early				Adjusted	199	1.42	2277	2302	
10	8-18-71	352	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	12,250	As received	151	4.23	717	720	10
								Timing 16° late. Idle speed 250 rpm low				Adjusted	154	4.06	1216	1221	
11	7-25-71	24340	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	12,250	As received	294	1.68	1325	1353	11
								Idle speed 150 RPM high				Adjusted	336	1.65	1362	1391	
12	8-12-71	24341K	Ryder	1970	IHC	478	V8	5 Hi-Lo	32,000	Tractor	15,087	As received	231	1.31	1838	1937	12
								Timing 6° early				Adjusted	201	1.15	1712	1814	
15	9-1-71	56	N.S.S.D.	1970	IHC	345	V8	5	25,500	School Bus	16,628	As received	253	1.34	2116	2256	15
								Timing 6° early. Idle speed 400 rpm high				Adjusted	274	1.23	1725	1839	
19	8-3-71	54	N.S.S.D.	1970	IHC	345	V8	5	22,000	School Bus	7,750	As received	193	1.52	2348	2517	19
								Timing 5° early. Idle speed 250 rpm high				Adjusted	227	1.36	2027	2130	
22	9-13-71	5131	C.P.S.B.	1971	IHC	392	V8	3 auto	25,500	Line	5,171	As received	213	2.94	1103	1061	22
								Timing 13° early				Adjusted	189	2.81	696	669	
23	9-20-71	5132	C.P.S.B.	1970	IHC	392	V8	3-auto	25,500	Line	3,471	As received	315	2.26	1871	1835	23
								Timing 10° early. Idle speed 225 rpm high				Adjusted	279	1.88	1815	1768	
24	1-20-72	5136	C.P.S.B.	1971	IHC	392	V8	3-auto	25,500	Line	7,414	As received	261	1.57	2230	1875	24
								Timing 5° early. Idle speed 150 rpm high				Adjusted	149	1.61	1414	1175	
27	8-23-71	6615	C.P.S.B.	1970	Ford	300	6	4	10,000	Service	4,300	As received	120	0.56	1140	1168	27
								Timing 8° late				Adjusted	183	0.68	2431	2492	
39	9-3-71	8810	C.P.S.B.	1970	Ford	300	6	4	16,000	Service	7,242	As received	251	3.52	1457	1457	39
								Timing 4° late. Idle speed 150 rpm low				Adjusted	247	3.63	1546	1535	
46	8-26-71	4950	C.P.S.B.	1970	IHC	304	V8	4	19,700	Bucket Truck	15,597	As received	198	1.75	2113	2098	46
								Idle Speed 300 rpm high				Adjusted	284	1.67	1997	1983	
47	10-10-71	312	C.W.B.	1970	IHC	304	V8	4	19,700	Service	12,014	As received	219	0.88	2884	2509	47
								Timing 6° early. Idle speed 125 rpm high				Adjusted	200	0.87	2560	2179	
48	9-25-71	314	C.W.B.	1970	IHC	304	V8	4	19,700	Service	4,589	As received	267	1.47	2618	2599	48
								Timing 11° early				Adjusted	250	1.39	2053	2039	
56	9-25-71	313	C.W.B.	1970	IHC	304	V8	4	19,700	Service	7,311	As received	249	1.31	2793	2843	56
								Timing 13° early				Adjusted	163	1.32	1804	1836	
67	10-3-71	252	C.W.B.	1970	Dodge	318	V8	3-auto	7,500	Service	4,979	As received	221	1.73	1522	1511	67
								Timing 5° late				Adjusted	228	1.74	1961	1947	
69	9-13-71	5133	C.P.S.B.	1970	IHC	392	V8	6-auto	25,500	Line	3,046	As received	213	1.66	1403	1350	69
								Timing 5° early				Adjusted	176	1.59	1252	1204	
70	9-9-71	5140	C.P.S.B.	1970	IHC	392	V8	6-auto	25,500	Line	7,902	As received	243	1.51	1625	1585	70
								Timing 5° early				Adjusted	222	1.30	1705	1686	
73	9-8-71	5130	C.P.S.B.	1970	IHC	392	V8	6-auto	25,500	Line	4,693	As received	287	2.66	1322	1288	73
								Timing 19° early. Idle speed 500 rpm high				Adjusted	277	2.49	1381	1345	
84	9-27-71	240	Herder	1970	Ford	361	V8	5	22,000	Freight	14,979	As received	311	2.41	1903	1890	84
								Timing 12° early				Adjusted	315	2.36	1799	1786	
96	10-30-71	4T1	B.C.R.D.	1970	Ford	240	6	3	7,500	Maintenance	10,882	As received	289	2.70	1181	1136	96
								Timing 6° late. Idle speed 150 rpm				Adjusted	347	2.86	1610	1549	
99	11-17-71	2T9	B.C.R.D.	1970	Ford	330	V8	4	21,000	Water Truck	11,214	As received	298	0.88	2973	3006	99
								Timing 7° early				Adjusted	264	0.92	2809	2839	
101	10-29-71	4T23	B.C.R.D.	1970	Ford	330	V8	5	21,000	Water Truck	18,295	As received	367	3.05	1883	1827	101
								Timing 7° early				Adjusted	341	3.85	1349	1309	
104	10-13-71	2085	P&R Dept.	1970	Chevrolet	307	V8	3	7,500	Maintenance	7,815	As received	204	2.15	1694	1712	104
								Timing 8° late				Adjusted	200	2.22	2205	2229	
110	10-11-71	2081	C.P.&R.	1970	Chevrolet	307	V8	3	7,500	Maintenance	3,970	As received	426	2.30	2425	2333	110
								Timing 4° early				Adjusted	860	2.05	1859	1781	
112	10-15-71	2170	C.P.&R.	1970	Chevrolet	307	V8	4	10,000	Maintenance	9,848	As received	207	2.32	2064	2064	112
								Timing 5° late. Idle 150 rpm low				Adjusted	220	2.46	2234	2234	
144	1-5-72	503	ABC	1971	IHC	478	V8	5	32,000	Rental	16,893	As received	233	1.28	1803	1498	144
								Idle Speed 200 rpm high				Adjusted	256	1.14	1927	1561	
150	1-24-72	4	JFC	1971	Chevrolet	350	V8	4	24,000	Delivery	15,475	As received	307	1.62	1594	1564	150
								Idle Speed 300 rpm high				Adjusted	291	1.61	1821	1841	
151	1-19-72	15T	Southern	1971	Chevrolet	427	V8	5	32,500	Moving	16,234	As received	1838	2.07	763	749	151
								Timing 10° late				Adjusted	260	2.37	1640	1640	

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*Hi-lo means two-speed rear axle.

TABLE D-36. EMISSION RESULTS FOR SURVEILLANCE FLEET VEHICLES REQUIRING TIMING OR IDLE SPEED ADJUSTMENTS FTP USING CONTINUOUS NDIR - TWELVE MONTHS INSPECTION

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW lbs	Vehicle Type	Test Miles	Condition	Emission Results HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
2	1-25-72	PO40999	P. O. D.	1970	Dodge	318	V-8	3 auto	10,000	Van	9,659	As received	252	1.51	2019	1648	2
								Timing 5° early				Adjusted	247	1.62	1538	1276	
4	1-26-72	PO41000	P. O. D.	1970	Dodge	318	V-8	3 auto	10,000	Van	12,828	As received	350	2.21	1481	1497	4
								Timing 10° early				Adjusted	296	2.29	1070	1089	
17	2-3-72	55	N. S. S. D.	1970	IHC	345	V-8	5	25,500	School Bus	28,088	As received	194	1.12	2289	1646	17
										Idle speed 175 rpm high		Adjusted	173	1.12	2308	1662	
22	2-7-72	5131	C. P. S. B.	1971	IHC	392	V-8	3 auto	25,500	Line	9,139	As received	215	2.63	1451	1114	22
								Timing 10° early				Adjusted	163	2.58	937	754	
23	2-8-72	5132	C. P. S. B.	1970	IHC	392	V-8	3 auto	25,500	Line	7,710	As received	201	1.65	1873	1526	23
								Timing 18° early				Adjusted	139	1.62	372	317	
47	3-5-72	312	C. W. B.	1970	IHC	304	V-8	4	19,700	Service	18,271	As received	242	0.94	2950	2510	47
								Timing 5° early				Adjusted	211	0.88	2848	2424	
56	3-5-72	313	C. W. B.	1970	IHC	304	V-8	4	19,700	Service	11,146	As received	225	1.22	2708	2223	56
								Timing 10° early				Adjusted	191	1.16	2497	2050	
58	3-4-72	316	C. W. B.	1970	IHC	304	V-8	4	19,700	Service	4,486	As received	166	1.15	1492	1482	58
								Timing 7° late				Adjusted	216	1.09	2526	2506	
59	3-4-72	317	C. W. B.	1970	IHC	304	V-8	4	19,700	Service	7,469	As received	244	1.09	2537	2387	59
								Timing 10° late				Adjusted	197	1.03	1803	1697	
64	3-1-72	582	Red Arrow	1970	Dodge	318	V-8	4	24,000	Freight	22,211	As received	259	1.68	1641	1682	64
								Timing 11° late				Adjusted	651	1.62	2379	2438	
66	3-18-72	251	C. W. B.	1970	Dodge	318	V-8	3 auto	7,500	Meter	10,821	As received	212	1.97	1440	1216	66
								Timing 5° late				Adjusted	226	1.88	1909	1615	
83	3-22-72	239	Herder	1970	Ford	361	V-8	5	22,000	Freight	14,450	As received	329	1.57	1120	1054	83
								Timing 5° late				Adjusted	341	1.53	1258	1184	
84	3-21-72	240	Herder	1970	Ford	361	V-8	5	22,000	Freight	21,901	As received	586	2.48	2364	2090	84
								Timing 9° early				Adjusted	382	2.56	1924	1701	
87	4-9-72	M-77	State Hosp.	1970	Dodge	225	6	3 auto	10,000	Grounds	3,468	As received	230	2.06	2334	2208	87
								Timing 5° early				Adjusted	194	1.96	2334	2208	
96	3-31-72	4T1	B. C. R. D.	1970	Ford	240	6	3	7,500	Maint.	17,218	As received	211	1.82	1088	870	96
								Timing 12° late, Idle speed 150 rpm low				Adjusted	311	1.89	1929	1543	
99	4-3-72	2T9	B. C. R. D.	1970	Ford	330	V-8	4	21,000	Water Tr.	66,227	As received	2093	0.81	2780	2727	99
								Timing 6° early				Adjusted	1959	0.82	1089	1014	
103	4-6-72	34	Southern	1970	GMC	427	V-8	5	32,500	Moving	46,976	As received	231	2.85	591	591	103
								Timing 6° early, Idle speed 150 rpm high				Adjusted	229	2.84	665	665	
106	3-9-72	2119	C. P. R.	1970	Ford	360	V-8	4	8,300	Maint.	3,756	As received	250	1.97	1853	1629	106
								Timing 8° late				Adjusted	154	2.10	1384	1217	
121	5-6-72	98	Facs	1970	GMC	292	6	4	10,000	Delivery	18,349	As received	208	0.51	3681	3696	121
								Timing 17° early				Adjusted	132	0.46	2524	2533	
122	5-7-72	101	Facs	1970	GMC	292	6	4	10,000	Delivery	18,550	As received	224	1.96	2744	2793	122
								Timing 7° early				Adjusted	198	1.98	2099	2137	
129	5-21-72	1088	Lone Star	1971	Ford	391	V-8	5	27,500	Delivery	14,034	As received	340	2.67	1694	1700	129
								Timing 6° late				Adjusted	305	2.49	1979	1986	
135	4-19-72	1345	S. A. P. W.	1971	IHC	392	V-8	6 auto	34,000	Garbage	11,691	As received	270	2.29	1791	1865	135
										Idle speed 400 rpm high		Adjusted	345	2.71	1577	1642	
137	4-25-72	1365	S. A. P. W.	1971	IHC	392	V-8	6 auto	34,000	Garbage	11,234	As received	321	2.68	1798	1662	137
								Timing 9° early				Adjusted	342	3.09	1284	1187	
151	5-3-72	15T	Southern	1971	Chevrolet	427	V-8	5	32,500	Moving	24,024	As received	232	1.82	1448	1370	151
								Timing 7° late				Adjusted	249	1.67	2043	1933	

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*Hi-lo means two-speed rear axle.

TABLE D-39. EMISSION RESULTS FOR VEHICLES REQUIRING TIMING OR IDLE SPEED ADJUSTMENTS HEAVY-DUTY GASOLINE SURVEILLANCE - EIGHTEEN MONTHS INSPECTION

Unit No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW, lbs	Vehicle Type	Test Mileage	Test Condition	Emission Results				Unit No.
													HC, ppm	CO, %	NO, ppm Obs.	NO, ppm Corr.	
3	7-26-72	P040997	P. O. D.	1970	Dodge	318	V8	3-auto	10,000	Van	15,745	As Received	221	1.65	847	822	3
								Timing 6° early				Adjusted	260	1.83	1028	997	
7	7-31-72	349	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	27,573	As Received	228	3.80	1101	1092	7
								Idle speed 150 rpm high				Adjusted	153	3.78	1090	1082	
9	8-1-72	350	ABC	1970	White	400	6	5 Hi-Lo	30,000	Tractor	28,311	As Received	298	2.74	2393	2321	9
								Timing 26° early				Adjusted	274	2.62	1674	1624	
16	8-30-72	53	NSSD	1970	IHC	345	V8	5	25,500	School Bus	40,536	As Received	439	2.07	2779	2827	16
								Timing 18° early				Adjusted	399	1.95	1434	1459	
19	8-29-72	54	NSSD	1970	IHC	345	V8	5	22,000	School Bus	29,460	As Received	290	1.51	2455	2481	19
								Idle speed 150 rpm high				Adjusted	289	1.57	2494	2521	
21	10-4-72	72218	Hertz	1970	Ford	240	6	3-auto	7,500	Pickup	30,968	As Received	304	2.45	1827	1772	21
								Timing 20° early				Adjusted	317	2.22	1775	1722	
23	8-4-72	5132	CPSB	1970	IHC	392	V8	3-auto	25,500	Line	11,100	As Received	198	1.39	1557	1528	23
								Timing 8° early				Adjusted	180	1.52	1304	1275	
24	8-9-72	5136	CPSB	1971	IHC	392	V6	3-auto	25,500	Line	14,548	As Received	296	2.22	1486	1486	24
								Timing 4° late				Adjusted	327	2.26	1646	1646	
28	8-16-72	6616	CPSB	1970	Ford	300	6	4	10,000	Service	14,386	As Received	181	0.49	2535	2545	28
								Timing 4° late				Adjusted	194	0.52	2916	2928	
39	9-7-72	8810	CPSB	1970	Ford	300	6	4	16,000	Service	27,812	As Received	283	3.09	1844	1837	39
								Idle speed 175 rpm high				Adjusted	239	3.02	1850	1844	
46	8-22-72	4950	CPSB	1970	IHC	304	V8	4	19,700	Bucket	38,930	As Received	269	1.65	2032	1861	46
								Timing 4° early				Adjusted	260	1.81	1860	1704	
58	9-9-72	316	CWB	1970	IHC	304	V8	4	19,700	Service	6,547	As Received	193	1.13	1761	1760	58
								Idle speed 125 rpm high				Adjusted	195	1.09	1775	1794	
59	9-9-72	317	CWB	1970	IHC	304	V8	4	19,700	Service	10,870	As Received	254	1.14	2699	2728	59
								Idle speed 150 rpm high				Adjusted	253	1.12	2690	2719	
60	9-30-72	253	CWB	1970	Chev	307	V8	4	7,500	Service	9,157	As Received	3906	1.92	923	820	60
								Timing 4° late				Adjusted	3869	1.96	1043	927	
63	9-16-72	392	CWB	1970	Chev	366	V8	5	32,000	Crane	3,329	As Received	139	1.79	701	732	63
								Idle speed 150 rpm high				Adjusted	148	1.62	774	809	
64	9-14-72	582	Red Arrow	1970	Dodge	318	V8	4	24,000	Freight	31,003	As Received	485	1.53	1986	1985	64
								Idle speed 125 rpm high				Adjusted	469	1.59	2141	2059	
84	10-4-72	240	Herder	1970	Ford	361	V8	5	22,000	Freight	29,403	As Received	566	2.46	2258	2125	84
								Timing 12° early				Adjusted	414	2.40	2044	1923	
88	10-14-72	M-87	State Hosp.	1970	Dodge	225	6	3-auto	7,500	Service	11,193	As Received	204	1.81	1352	1337	88
								Timing 6° late				Adjusted	191	1.77	1619	1601	

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*Hi-Lo means two-speed rear axle.

TABLE D-40. EMISSION RESULTS FOR VEHICLES REQUIRING TIMING OR IDLE SPEED ADJUSTMENTS
HEAVY-DUTY GASOLINE SURVEILLANCE - TWENTY-FOUR MONTHS INSPECTION

													Emission Results				
Jait No.	Date Tested	Truck No.	Source	Vehicle Year	Make	Engine CID	Cyl.	Trans. Speeds*	GVW, lbs	Vehicle Type	Test Mileage	Test Condition	HC, ppm	CO %	NO, ppm Obs.	NO, ppm Corr.	Unit No.
20	3-12-73	72341	Herts	1970	Ford	300	6	3-auto	10,000	Stake	24,342	As received	161	1.13	2613	2762	20
								Timing 17° early				Adjusted	152	0.85	1648	1742	
46	3-5-73	4950	CPSB	1970	IHC	304	V8	4	19,700	Bucket	51372	As received	300	2.26	2394	2164	46
								Timing 11° early				Adjusted	283	2.20	2164	2225	
145	5-7-73	3	JFC	1971	Chev	350	V8	4	24,000	Delivery	38190	As received	360	1.52	2575	2585	145
								Timing 9° early				Adjusted	272	1.76	1517	1523	
148	6-25-73	2	JFC	1971	Chev	350	V8	4	24,000	Delivery	50560	As received	344	1.49	1323	1351	148
								Timing 4° early				Adjusted	303	2.18	927	899	
152	5-7-73	6	JFC	1971	Chev	350	V8	4	24,000	Delivery	39976	As received	322	1.94	2646	2657	152
								Timing 10° early				Adjusted	210	1.78	1393	1398	

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* Hi-lo means two-speed rear axle.

TABLE D-41. EMISSION RESULTS FOR VEHICLES REQUIRING TIMING OR IDLE SPEED ADJUSTMENTS
HEAVY-DUTY GASOLINE SURVEILLANCE - THIRTY MONTHS INSPECTION

Unit No.	Date Tested	Truck No.	Source	Vehicle No.	Make	Engine CID	Cyl.	Trans. Speeds*	GVW, lbs	Vehicle Type	Test Mileage	Test Condition	Emission Results				Unit No.
													HC, ppm	CO %	NO, ppm Obs.	NO, ppm Corr.	
8	9-11-73	351	ABC	1970	White	400	6	5 hi-lo	30,000	Tractor	45548	As received	303	3.11	1920	1955	8
								Timing 12° early				Adjusted	249	2.63	1534	1551	
9	9-17-73	350	ABC	1970	White	400	6	5 hi-lo	30,000	Tractor	53926	As received	352	4.42	1343	1317	9
								Timing 12° early				Adjusted	265	4.41	1161	1126	

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* Hi-lo means two-speed rear axle.

TABLE D-42. PERCENT CHANGE IN EMMISSIONS FROM TIMING OR IDLE SPEED ADJUSTMENTS FOUR MONTHS INSPECTION

ROUND NO. 2

	HYDROCARBONS PPM				CARBON MONOXIDE PCT.				NITRIC OXIDE PPM				CORR. NO PPM			
TRUCK NUMBER	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.
19	239	241	2	.8	1.53	1.53	0.00	0.0	1950	1939	-11	-.6	1995	1984	-11	-.7
22	288	250	-38	-13.2	2.77	2.71	-.06	-2.2	1137	651	-486	-42.7	1157	663	-494	-42.7
23	365	296	-69	-18.9	2.27	2.19	-.08	-3.5	1642	871	-771	-47.0	1704	804	-900	-52.8
24	255	238	-17	-6.7	2.08	2.10	.02	1.0	1493	1507	14	.9	1493	1507	14	.9
25	261	249	-12	-4.6	2.38	2.37	-.01	-.4	879	747	-132	-15.0	924	785	-139	-15.0
40	212	187	-25	-11.8	.31	.29	-.02	-6.5	3347	2770	-577	-17.2	3093	2559	-534	-17.3
43	210	216	6	2.9	.70	.74	.04	5.7	2572	3224	652	25.3	2366	2966	600	25.4
47	223	210	-13	-5.8	1.27	1.25	-.02	-1.6	2155	1613	-542	-25.2	2114	1582	-532	-25.2
49	264	206	-58	-22.0	1.45	1.44	-.01	-.7	2319	1966	-353	-15.2	2328	1974	-354	-15.2
50	247	226	-21	-8.5	2.60	2.55	-.05	-1.9	1743	1457	-286	-16.4	1749	1463	-286	-16.4
57	295	286	-9	-3.1	1.41	1.54	.13	9.2	2517	2333	-184	-7.3	2683	2487	-196	-7.3
58	240	195	-45	-18.7	1.30	1.27	-.03	-2.3	2332	1509	-823	-35.3	2451	1586	-865	-35.3
60	245	246	1	.4	3.39	3.33	-.06	-1.8	1539	1172	-367	-23.8	1617	1232	-385	-23.8
61	192	261	69	35.9	2.56	3.37	.81	31.6	1199	1406	207	17.3	1260	1478	218	17.3
62	186	177	-9	-4.8	.76	.63	-.13	-17.1	1084	1041	-43	-4.0	1146	1100	-46	-4.0
74	309	266	-43	-13.9	1.71	1.67	-.04	-2.3	1629	1489	-140	-8.6	1691	1546	-145	-8.6
80	284	267	-17	-6.0	2.98	2.95	-.03	-1.0	2336	1691	-645	-27.6	2504	1813	-691	-27.6
82	150	158	8	5.3	.65	.65	0.00	0.0	2521	2145	-376	-14.9	2599	2111	-488	-18.8
92	280	275	-5	-1.8	1.73	1.94	.21	12.1	1850	1924	74	4.0	1850	1887	37	2.0
93	298	290	-8	-2.7	2.23	2.32	.09	4.0	1680	1837	157	9.3	1648	1802	154	9.3
96	327	248	-79	-24.2	1.13	.99	-.14	-12.4	1703	2336	633	37.2	1734	2378	644	37.1
97	344	237	-107	-31.1	1.54	1.53	-.01	-.6	1865	1966	101	5.4	1899	2001	102	5.4
98	300	261	-39	-13.0	.52	.52	0.00	0.0	3009	2517	-492	-16.4	3063	2562	-501	-16.4
99	388	252	-136	-35.1	.81	.80	-.01	-1.2	3331	2838	-493	-14.8	3268	2784	-484	-14.8
100	349	304	-45	-12.9	.91	.90	-.01	-1.1	2738	2532	-206	-7.5	2686	2484	-202	-7.5
101	359	319	-40	-11.1	1.22	1.31	.09	7.4	2734	2295	-439	-16.1	2783	2336	-447	-16.1
102	292	269	-23	-7.9	2.19	1.84	-.35	-16.0	2172	1873	-299	-13.8	2131	1837	-294	-13.8
103	236	274	38	16.1	2.18	2.11	-.07	-3.2	1389	1501	112	8.1	1389	1501	112	8.1
106	274	268	-6	-2.2	2.29	2.33	.04	1.7	1597	1619	22	1.4	1567	1588	21	1.3
111	246	241	-5	-2.0	2.41	2.28	-.13	-5.4	1797	1777	-20	-1.1	1889	1868	-21	-1.1
113	329	284	-45	-13.7	3.66	3.40	-.26	-7.1	920	628	-292	-31.7	955	652	-303	-31.7
118	338	313	-25	-7.4	1.92	1.99	.07	3.6	1804	1798	-6	-.3	1770	1758	-12	-.7
122	317	315	-2	-.6	1.99	2.11	.12	6.0	2445	1890	-555	-22.7	2496	1930	-566	-22.7
125	322	324	2	.6	2.05	2.26	.21	10.2	1252	1261	9	.7	1316	1325	9	.7
134	229	179	-50	-21.8	6.56	6.59	.03	.5	434	492	58	13.4	429	506	77	17.9

AVERAGE PERCENT CHANGE		
	HC	-7.5
	CO	.1
	NO	-8.6
	CORR NO	-8.9

TABLE D-41. PERCENT CHANGE IN EMISSIONS FROM TIMING OR IDLE SPEED ADJUSTMENTS
EIGHT MONTHS INSPECTION

ROUND NO. 3

TRUCK NUMBER	HYDROCARBONS PPM AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	CARBON MONOXIDE PCT. AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	NITRIC OXIDE PPM AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	CORR. NO PPM AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.
6	306	199	-107	-35.0	1.67	1.42	-.25	-15.0	2515	2277	-238	-9.5	2543	2302	-241	-9.5
10	151	154	3	2.0	4.23	4.08	-.15	-3.5	717	1216	499	69.6	720	1221	501	69.6
11	294	336	42	14.3	1.68	1.65	-.03	-1.8	1325	1362	37	2.8	1353	1391	38	2.8
12	231	201	-30	-13.0	1.31	1.15	-.16	-12.2	1838	1712	-126	-6.9	1937	1814	-123	-6.4
15	253	274	21	8.3	1.34	1.23	-.11	-8.2	2116	1725	-391	-18.5	2256	1839	-417	-18.5
19	193	227	34	17.6	1.52	1.36	-.16	-10.5	2348	2027	-321	-13.7	2517	2130	-387	-15.4
22	213	189	-24	-11.3	2.94	2.81	-.13	-4.4	1103	696	-407	-36.9	1061	669	-392	-36.9
23	315	279	-36	-11.4	2.26	1.88	-.38	-16.8	1871	1815	-56	-3.0	1835	1768	-67	-3.7
24	261	149	-112	-42.9	1.57	1.61	.04	2.5	2230	1414	-816	-36.6	1875	1175	-700	-37.3
27	120	183	63	52.5	.56	.68	.12	21.4	1140	2431	1291	113.2	1168	2492	1324	113.4
39	551	542	-9	-1.6	3.52	3.63	.11	3.1	1457	1546	89	6.1	1457	1535	78	5.4
46	198	284	86	43.4	1.75	1.67	-.08	-4.6	2113	1997	-116	-5.5	2098	1983	-115	-5.5
47	219	200	-19	-8.7	.88	.87	-.01	-1.1	2884	2560	-324	-11.2	2509	2179	-330	-13.2
48	267	250	-17	-6.4	1.47	1.39	-.08	-5.4	2618	2053	-565	-21.6	2599	2039	-560	-21.5
66	249	163	-86	-34.5	1.37	1.38	.01	.8	2793	1804	-989	-35.4	2843	1836	-1007	-35.4
67	221	228	7	3.2	1.73	1.74	.01	.6	1522	1961	439	28.8	1511	1947	436	28.9
68	213	176	-37	-17.4	1.66	1.59	-.07	-4.2	1403	1252	-151	-10.8	1350	1204	-146	-10.8
70	243	222	-21	-8.6	1.51	1.30	-.21	-13.9	1625	1705	80	4.9	1583	1686	103	6.5
73	287	277	-10	-3.5	2.66	2.49	-.17	-6.4	1322	1381	59	4.5	1288	1345	57	4.4
84	311	315	4	1.3	2.41	2.36	-.05	-2.1	1903	1799	-104	-5.5	1890	1786	-104	-5.5
96	289	347	58	20.1	2.70	2.86	.16	5.9	1181	1610	429	36.3	1136	1549	413	36.4
99	298	264	-34	-11.4	.88	.92	.04	4.5	2973	2809	-164	-5.5	3006	2839	-167	-5.6
101	367	341	-26	-7.1	3.05	3.85	.80	26.2	1883	1349	-534	-28.4	1827	1309	-518	-28.4
104	204	200	-4	-2.0	2.15	2.22	.07	3.3	1694	2205	511	30.2	1712	2229	517	30.2
110	426	860	434	101.9	2.30	2.05	-.25	-10.9	2425	1859	-566	-23.3	2333	1781	-552	-23.7
112	207	220	13	6.3	2.32	2.46	.14	6.0	2064	2234	170	8.2	2064	2234	170	8.2
144	233	256	23	9.9	1.28	1.14	-.14	-10.9	1803	1927	124	6.9	1498	1561	63	4.2
150	307	291	-16	-5.2	1.62	1.61	-.01	-.6	1594	1821	227	14.2	1564	1841	277	17.7
151	1838	260	-1578	-85.9	2.07	2.37	.30	14.5	763	1640	877	114.9	749	1640	891	119.0

AVERAGE PERCENT CHANGE	
HC	-.4
CO	-1.5
NO	5.8
CORR NO	5.8

TABLE D-44. PERCENT CHANGE IN SURVEILLANCE FLEET CONTINUOUS NDIR EMISSIONS
FROM TIMING OR IDLE SPEED ADJUSTMENTS - TWELVE MONTHS INSPECTION

ROUND NO. 4

	HYDROCARBONS PPM				CARBON MONOXIDE PCT.				NITRIC OXIDE PPM				CORR. NO PPM			
TRUCK NUMBER	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.
2	252	247	-5	-2.0	1.51	1.62	.11	7.3	2019	1538	-481	-23.8	1648	1278	-370	-22.5
4	350	296	-54	-15.4	2.21	2.29	.08	3.6	1481	1070	-411	-27.8	1497	1089	-408	-27.3
17	194	173	-21	-10.8	1.12	1.12	0.00	0.0	2289	2308	19	.8	1638	1652	14	.8
22	215	163	-52	-24.2	2.63	2.58	-.05	-1.9	1451	932	-519	-35.8	1119	759	-360	-32.2
23	201	139	-62	-30.8	1.65	1.62	-.03	-1.8	1873	372	-1501	-80.1	1528	317	-1211	-79.3
47	242	211	-31	-12.8	.94	.88	-.06	-6.4	2950	2848	-102	-3.5	2510	2424	-86	-3.4
56	225	191	-34	-15.1	1.22	1.16	-.06	-4.9	2708	2497	-211	-7.8	2223	2050	-173	-7.8
58	166	216	50	30.1	1.15	1.09	-.06	-5.2	1492	2526	1034	69.3	1482	2508	1026	69.2
59	244	197	-47	-19.3	1.09	1.03	-.06	-5.5	2537	1803	-734	-28.9	2387	1697	-690	-28.9
64	259	651	392	151.4	1.68	1.62	-.06	-3.6	1641	2379	738	45.0	1682	2438	756	44.9
66	212	226	14	6.6	1.97	1.88	-.09	-4.6	1440	1909	469	32.6	1218	1615	397	32.6
83	334	346	12	3.6	1.57	1.53	-.04	-2.5	1120	1258	138	12.3	1054	1184	130	12.3
84	586	382	-204	-34.8	2.48	2.56	.08	3.2	2364	1924	-440	-18.6	2090	1701	-389	-18.6
87	230	194	-36	-15.7	2.06	1.96	-.10	-4.9	2334	2334	0	0.0	2208	2208	0	0.0
96	211	311	100	47.4	1.82	1.89	.07	3.8	1088	1929	841	77.3	870	1543	673	77.4
99	2093	1959	-134	-6.4	.81	.82	.01	1.2	2780	1087	-1693	-60.9	2727	1014	-1713	-62.8
103	231	229	-2	-.9	2.85	2.84	-.01	-.4	591	665	74	12.5	591	665	74	12.5
106	250	154	-96	-38.4	1.97	2.10	.13	6.6	1853	1384	-469	-25.3	1629	1217	-412	-25.3
121	208	132	-76	-36.5	.51	.46	-.05	-9.8	3681	2524	-1157	-31.4	3696	2533	-1163	-31.5
122	224	198	-26	-11.6	1.96	1.98	.02	1.0	2744	2099	-645	-23.5	2793	2137	-656	-23.5
129	340	305	-35	-10.3	2.67	2.49	-.18	-6.7	1694	1979	285	16.8	1700	1986	286	16.8
135	270	345	75	27.8	2.29	2.71	.42	18.3	1791	1577	-214	-11.9	1865	1642	-223	-12.0
137	321	342	21	6.5	2.68	3.09	.41	15.3	1798	1284	-514	-28.6	1662	1187	-475	-28.6
151	232	249	17	7.3	1.82	1.67	-.15	-8.2	1448	2043	595	41.1	1370	1933	563	41.1

AVERAGE PERCENT CHANGE		
	HC	-.2
	CO	-.2
	NO	-4.2
	CORR NO	-4.0

TABLE D-45. PERCENT CHANGE IN EMISSIONS FROM TIMING OR IDLE SPEED ADJUSTMENTS
EIGHTEEN MONTHS INSPECTION

ROUND NO. 5

TRUCK NUMBER	HYDROCARBONS PPM AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	CARBON MONOXIDE PCT. AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	NITRIC OXIDE PPM AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	CORR. NO PPM AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.
3	221	260	39	17.6	1.65	1.83	.18	10.9	847	1028	181	21.4	822	997	175	21.3
7	228	153	-75	-32.9	3.80	3.78	-.02	-.5	1101	1090	-11	-1.0	1092	1082	-10	-.9
8	298	274	-24	-8.1	2.74	2.62	-.12	-4.4	2393	1674	-719	-30.0	2321	1624	-697	-30.0
16	439	399	-40	-9.1	2.07	1.95	-.12	-5.8	2779	1434	-1345	-48.4	2827	1459	-1368	-48.4
19	290	289	-1	-.3	1.51	1.57	.06	4.0	2455	2494	39	1.6	2481	2521	40	1.6
21	304	317	13	4.3	2.45	2.22	-.23	-9.4	1827	1775	-52	-2.8	1772	1722	-50	-2.8
23	198	180	-18	-9.1	1.39	1.52	.13	9.4	1557	1304	-253	-16.2	1528	1275	-253	-16.6
24	296	327	31	10.5	2.22	2.26	.04	1.8	1486	1646	160	10.8	1486	1646	160	10.8
28	181	194	13	7.2	.49	.52	.03	6.1	2535	2916	381	15.0	2545	2928	383	15.0
39	283	239	-44	-15.5	3.09	3.02	-.07	-2.3	1844	1850	6	.3	1837	1844	7	.4
46	269	260	-9	-3.3	1.85	1.81	-.04	-2.2	2032	1860	-172	-8.5	1861	1704	-157	-8.4
58	193	195	2	1.0	1.13	1.09	-.04	-3.5	1761	1775	14	.8	1780	1794	14	.8
59	254	253	-1	-.4	1.14	1.12	-.02	-1.8	2699	2690	-9	-.3	2728	2719	-9	-.3
60	3906	3869	-37	-.9	1.92	1.96	.04	2.1	923	1043	120	13.0	820	927	107	13.0
63	139	148	9	6.5	1.79	1.62	-.17	-9.5	701	774	73	10.4	732	809	77	10.5
64	485	469	-16	-3.3	1.53	1.59	.06	3.9	1986	2141	155	7.8	1985	2059	74	3.7
84	566	414	-152	-26.9	2.96	2.90	-.06	-2.4	2258	2044	-214	-9.5	2125	1923	-202	-9.5
88	204	191	-13	-6.4	1.81	1.77	-.04	-2.2	1352	1619	267	19.7	1337	1601	264	19.7

AVERAGE PERCENT CHANGE		
	HC	-3.8
	CO	-.3
	NO	-.9
	CORR NO	-1.1

TABLE D-46. PERCENT CHANGE IN EMISSIONS FROM TIMING OR IDLE SPEED ADJUSTMENTS
TWENTY-FOUR MONTHS INSPECTION

ROUND NO. 6

	HYDROCARBONS PPM				CARBON MONOXIDE PCT.				NITRIC OXIDE PPM				CORR. NO PPM			
TRUCK NUMBER	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.
20	161	152	-9	-5.6	1.13	.85	-.28	-24.8	2613	1648	-965	-36.9	2762	1742	-1020	-36.9
96	300	283	-17	-5.7	2.26	2.20	-.06	-2.7	2399	2169	-230	-9.6	2461	2225	-236	-9.6
145	360	272	-88	-24.4	1.52	1.76	.24	15.8	2575	1517	-1058	-41.1	2585	1523	-1062	-41.1
148	344	303	-41	-11.9	1.49	2.18	.69	46.3	1323	927	-396	-29.9	1351	899	-452	-33.5
152	322	210	-112	-34.8	1.94	1.78	-.16	-8.2	2646	1393	-1253	-47.4	2657	1398	-1259	-47.4

AVERAGE PERCENT CHANGE		
	HC	-16.5
	CO	5.3
	NO	-33.0
	CORR NO	-33.7

TABLE D-47. PERCENT CHANGE IN EMISSIONS FROM TIMING OR IDLE SPEED ADJUSTMENTS
THIRTY MONTHS INSPECTION

ROUND NO. 7

	HYDROCARBONS PPM				CARBON MONOXIDE PCT.				NITRIC OXIDE PPM				CORR. NO PPM			
TRUCK NUMBER	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.	AS RECEIVED	IN SPEC	DIFF.	PCT. DIFF.
8	303	244	-59	-17.8	3.11	2.63	-.48	-15.4	1920	1534	-386	-20.1	1955	1551	-404	-20.7
9	352	265	-87	-24.7	4.92	4.91	-.01	-.2	1343	1161	-182	-13.6	1317	1126	-191	-14.5

AVERAGE PERCENT CHANGE		
	HC	-21.3
	CO	-7.8
	NO	-16.8
	CORR NO	-17.6

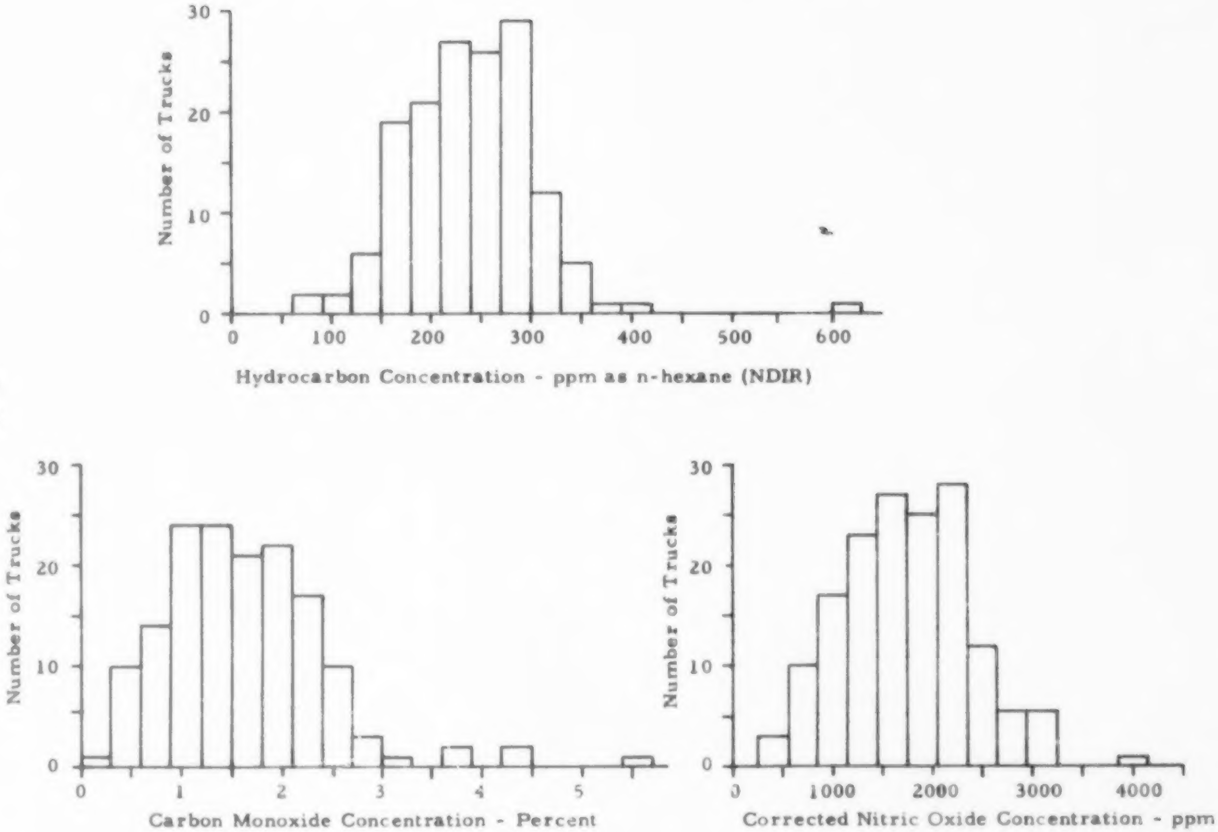

FIGURE D-1. FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR FIRST ROUND INSPECTIONS (152 TRUCKS)

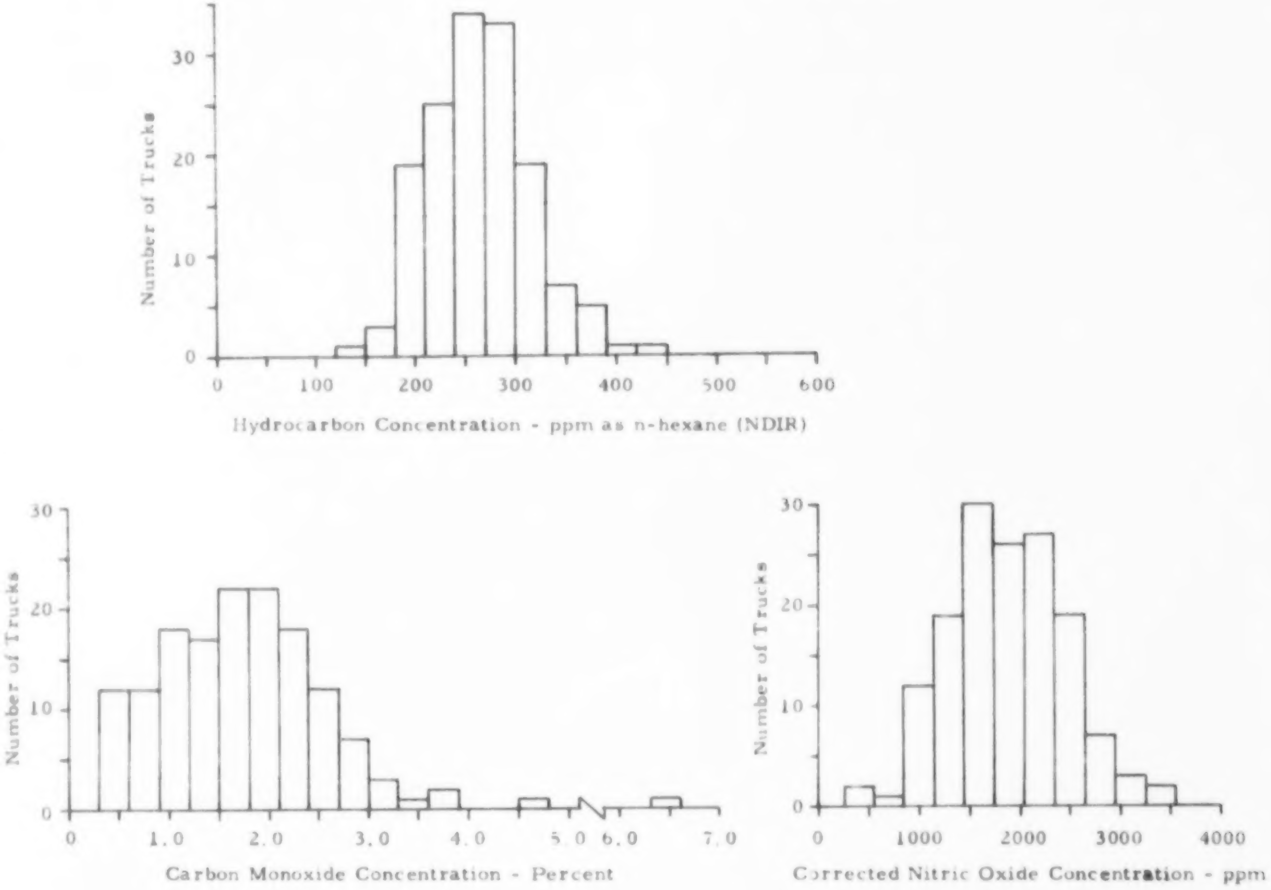

FIGURE D-2. FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR SECOND ROUND INSPECTIONS (148 TRUCKS)

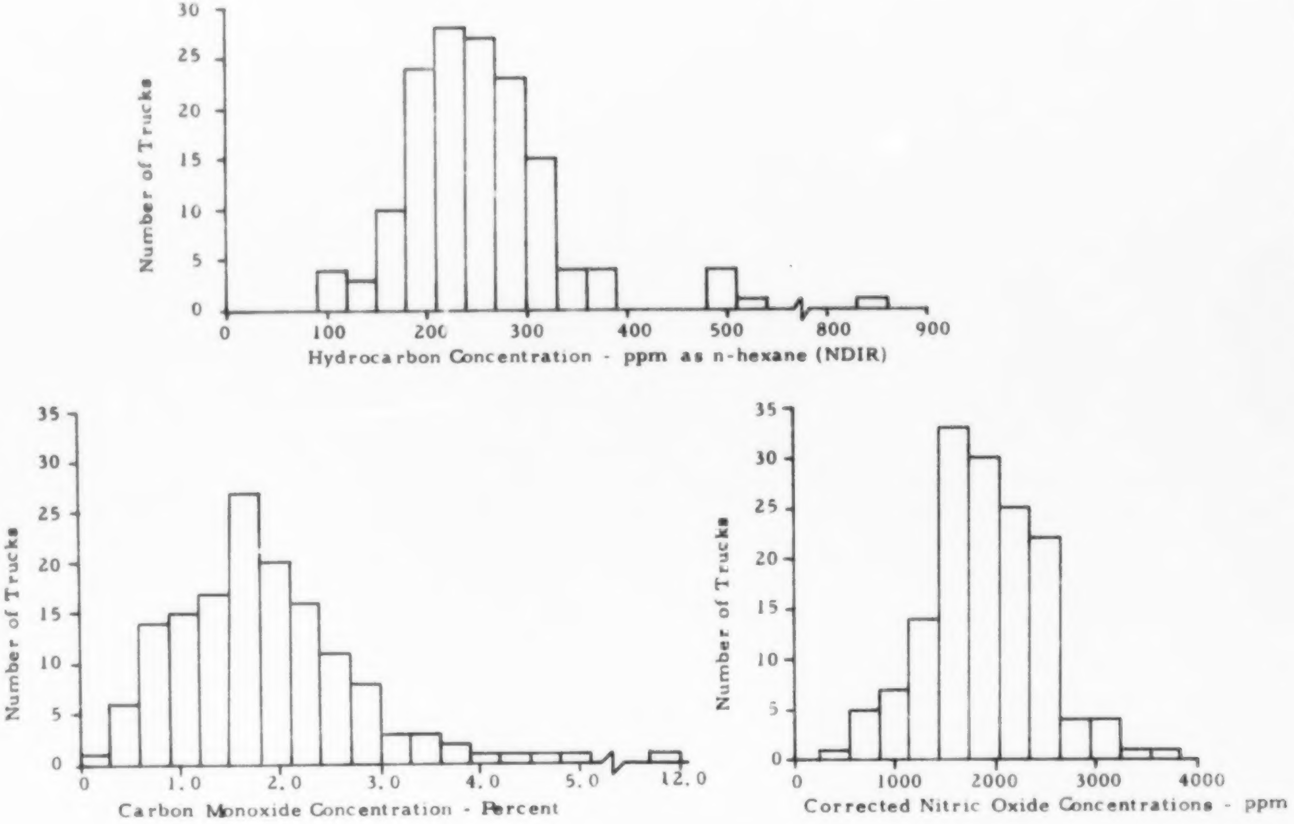

FIGURE D-3. FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR THIRD ROUND INSPECTIONS (148 TRUCKS)

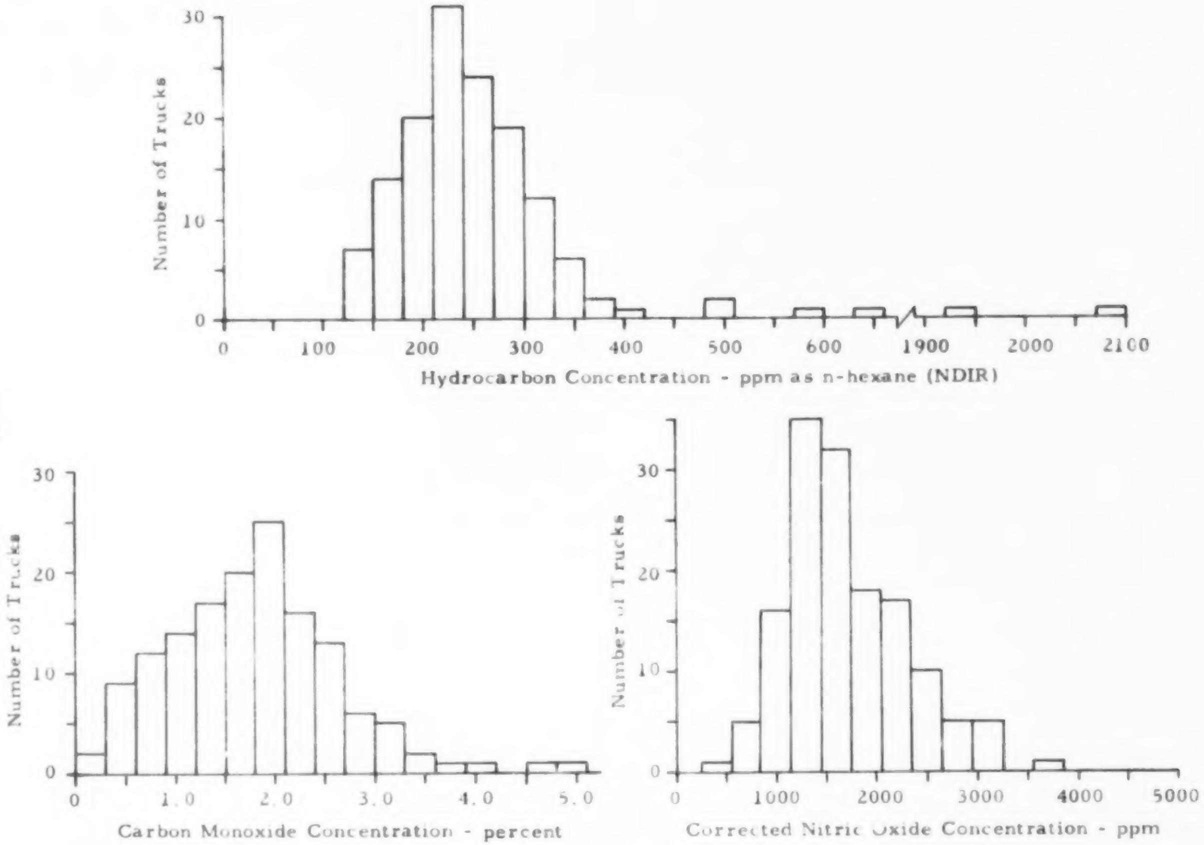

FIGURE D-4. FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR FOURTH ROUND INSPECTIONS (145 TRUCKS)

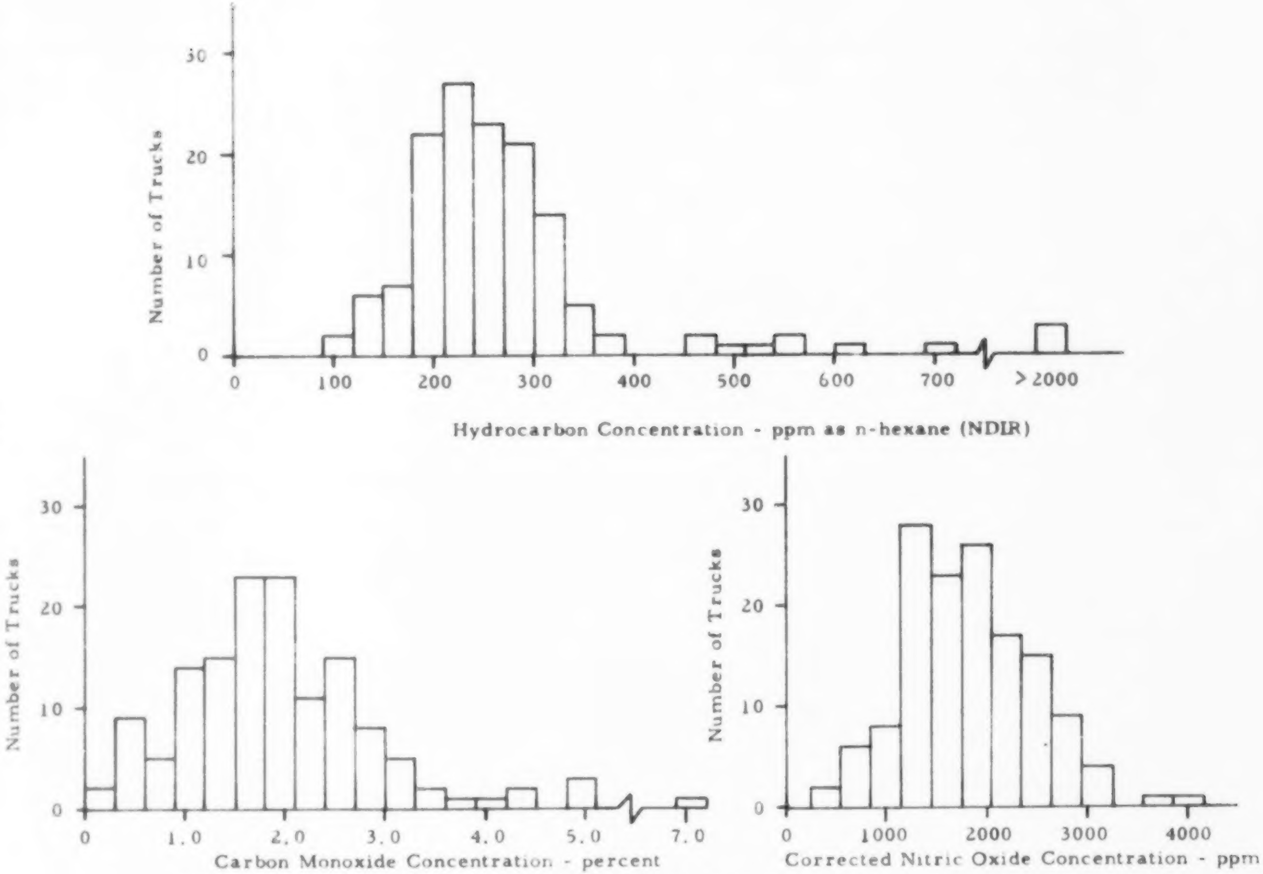

FIGURE D-5. FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR FIFTH ROUND INSPECTIONS (140 TRUCKS)

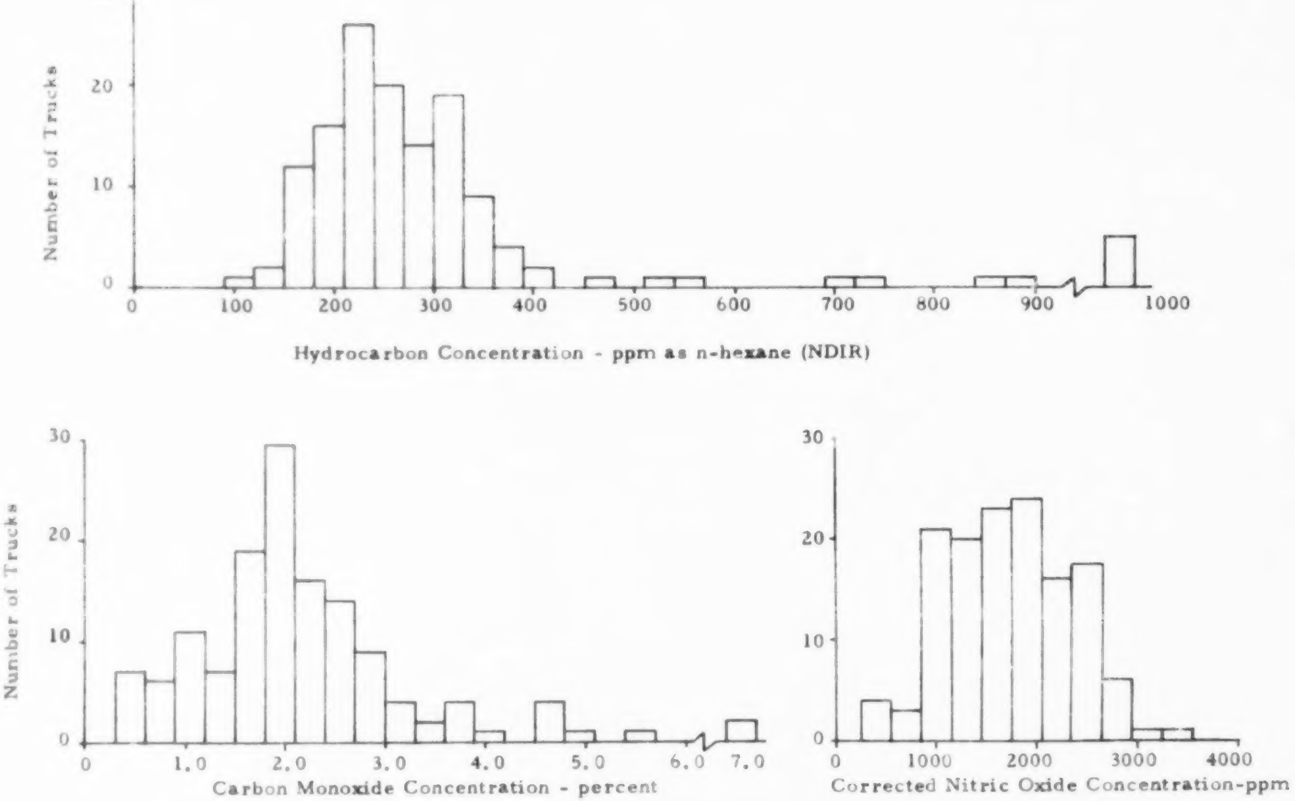

FIGURE D-6. FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR SIXTH ROUND INSPECTIONS (137 TRUCKS)

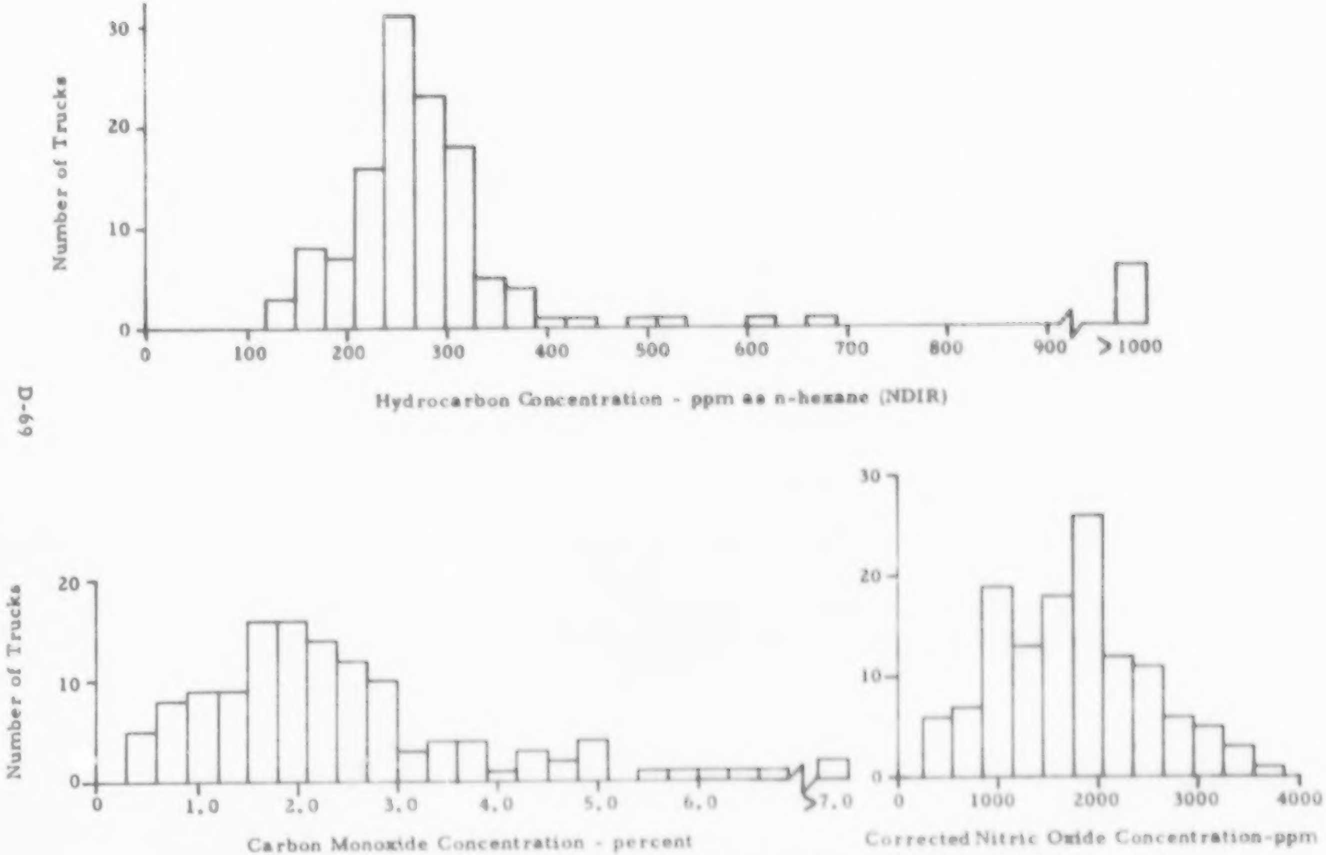

FIGURE D-7. FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR SEVENTH ROUND INSPECTIONS (127 TRUCKS)

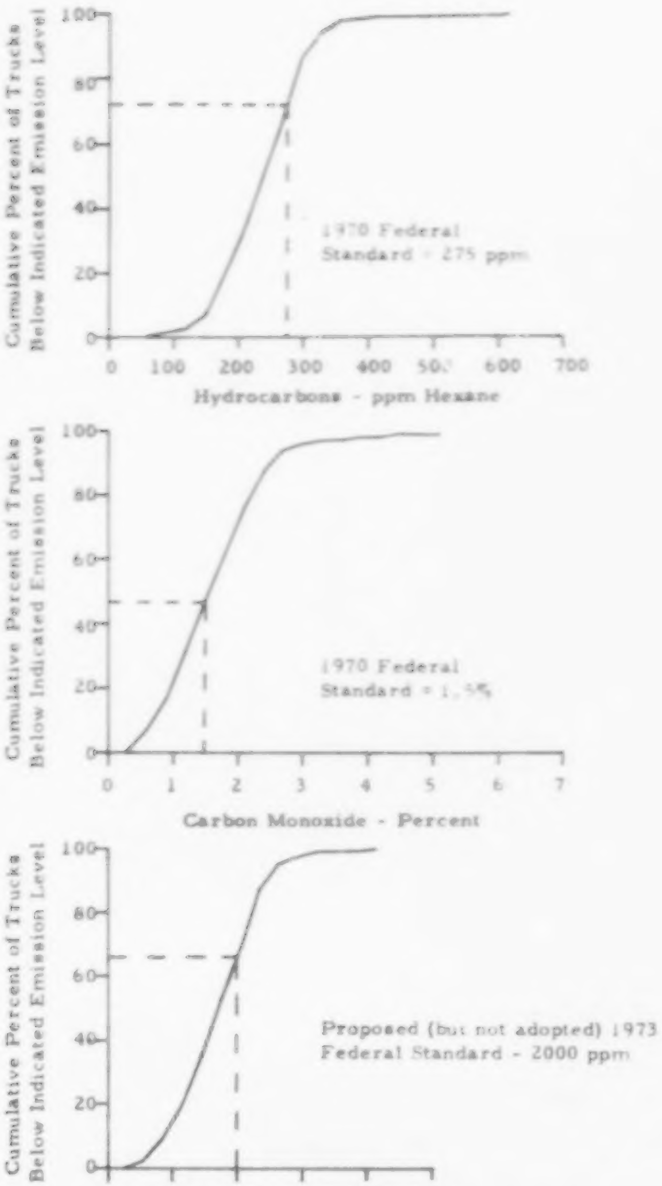

FIGURE D-8 CUMULATIVE FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR FIRST ROUND INSPECTIONS (152 TRUCKS)

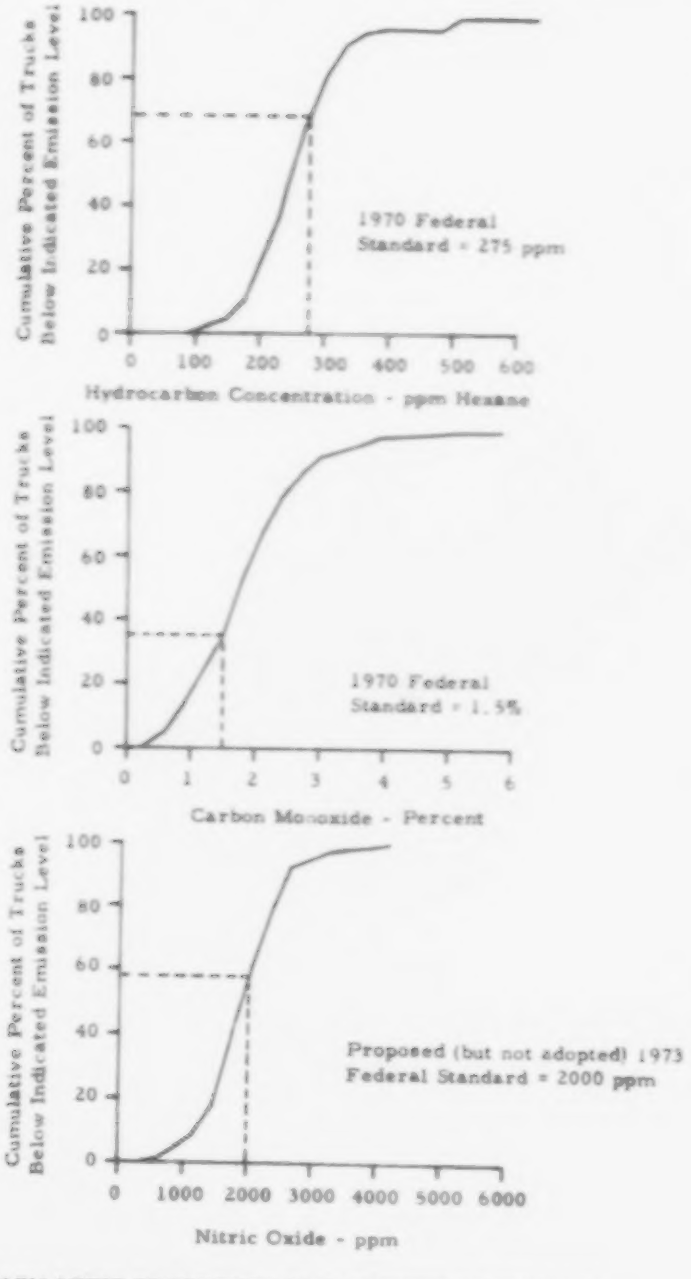

FIGURE D-9. CUMULATIVE FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR THIRD ROUND INSPECTIONS (148 TRUCKS)

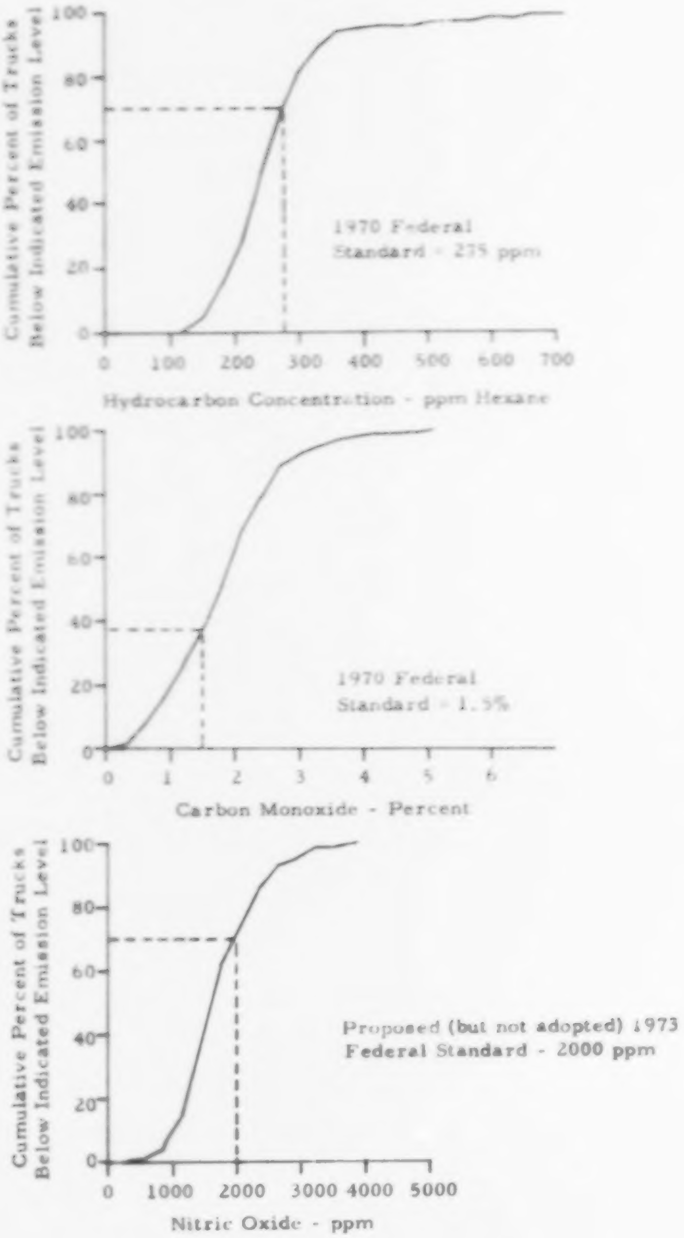

FIGURE D-10. CUMULATIVE FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR FOURTH ROUND INSPECTIONS (145 TRUCKS)

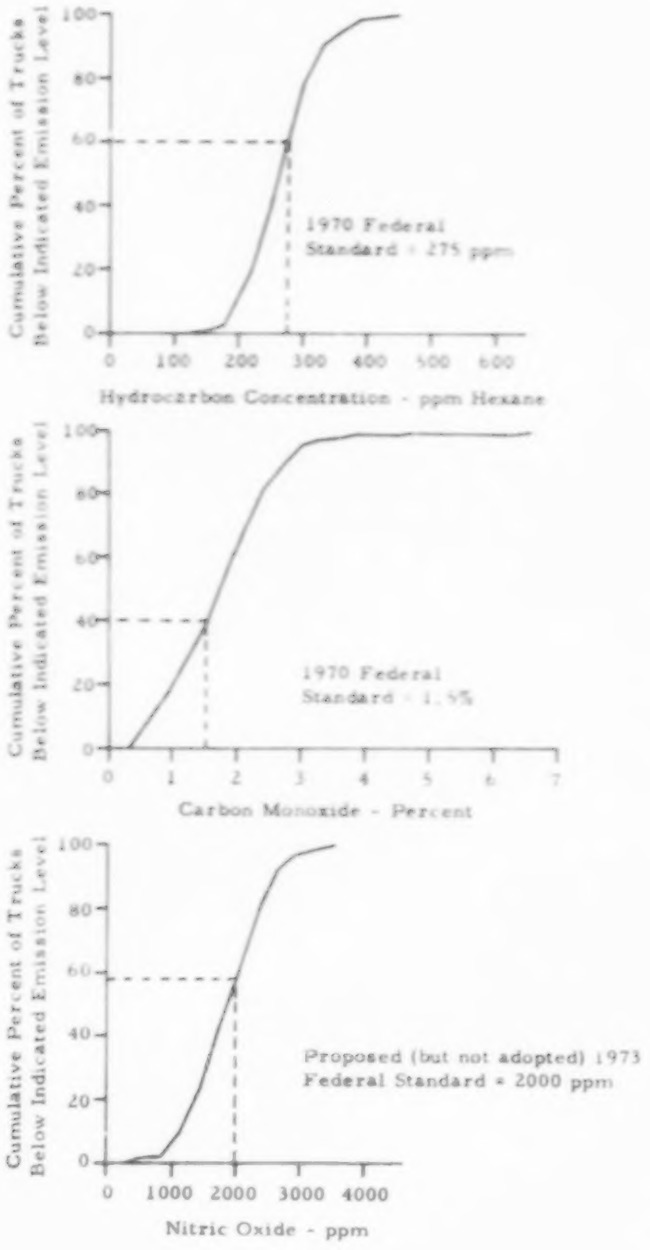

FIGURE D-11. CUMULATIVE FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR SECOND ROUND INSPECTIONS (148 TRUCKS)

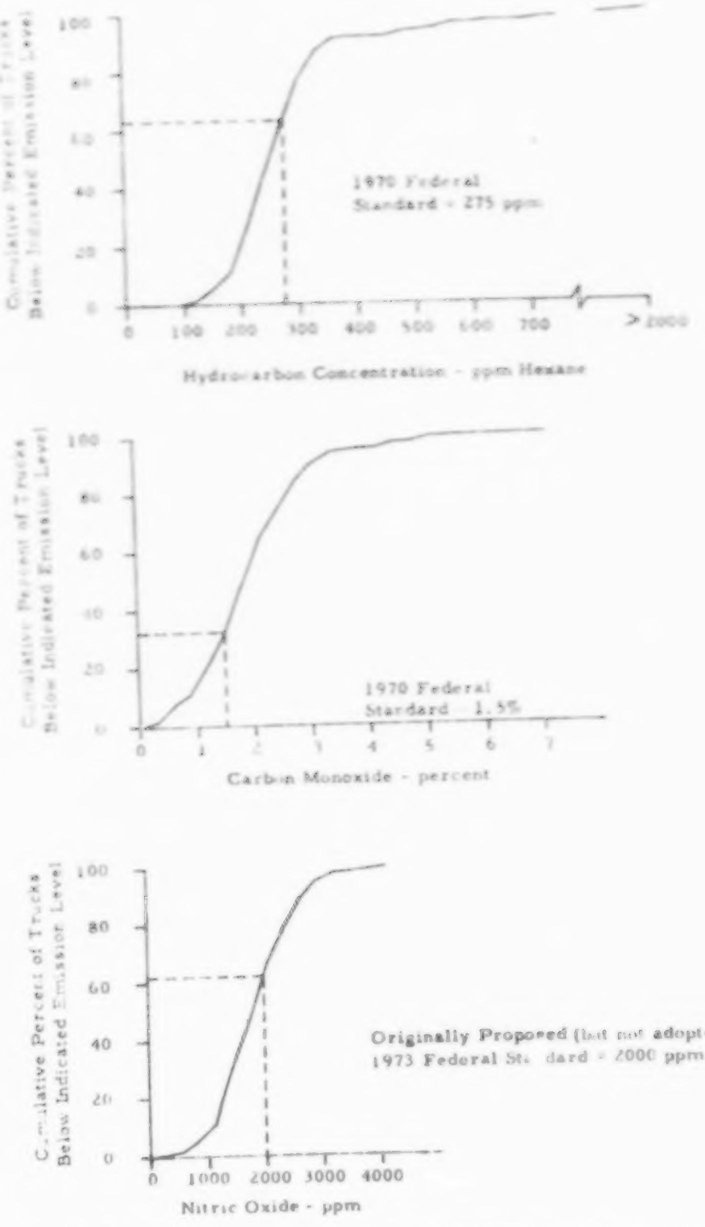

FIGURE D-12. CUMULATIVE FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR FIFTH ROUND INSPECTIONS (140 TRUCKS)

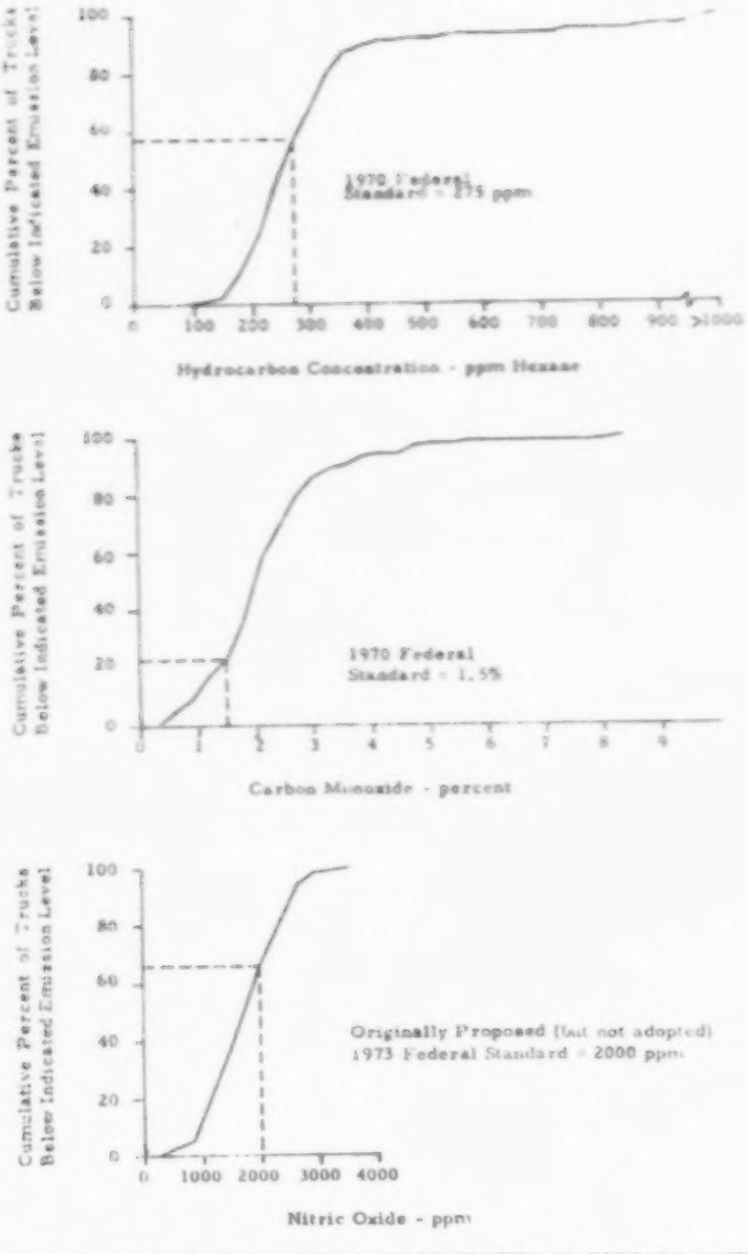

FIGURE D-13. CUMULATIVE FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR SIXTH ROUND INSPECTIONS (137 TRUCKS)

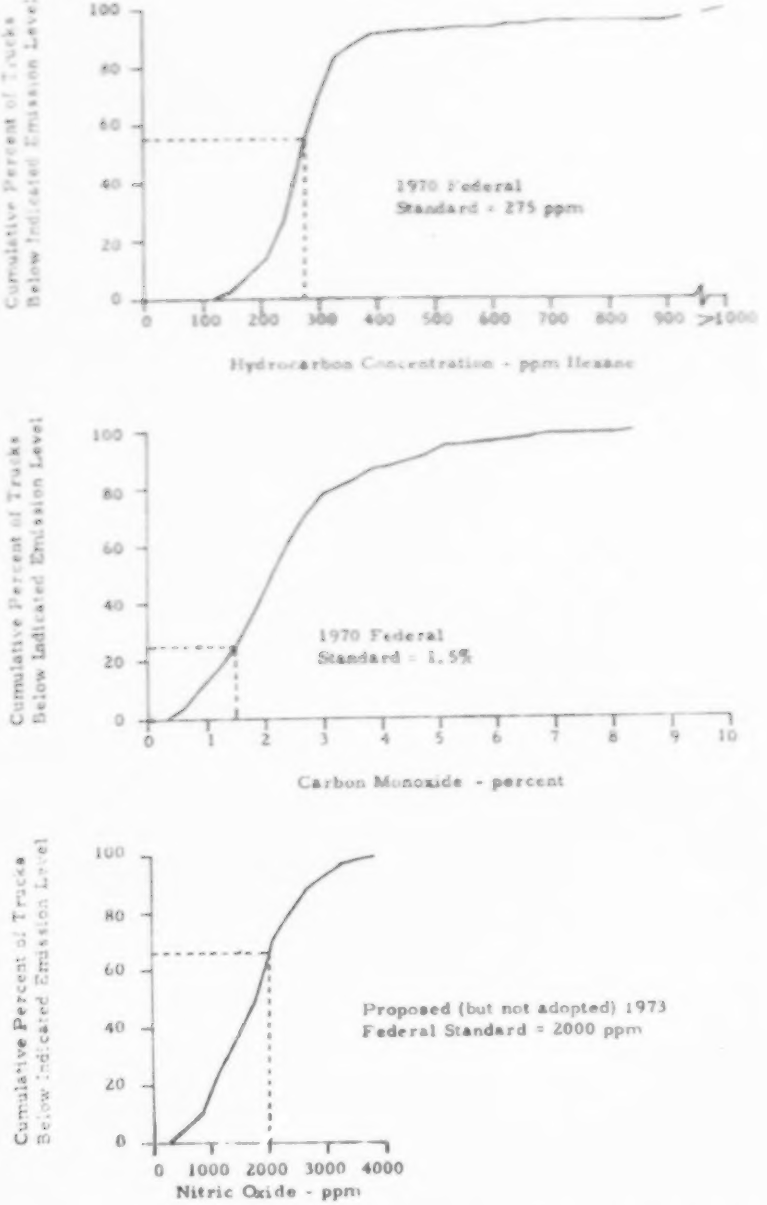

FIGURE D-14. CUMULATIVE FREQUENCY DISTRIBUTION OF EXHAUST EMISSION LEVELS FOR SEVENTH ROUND INSPECTIONS (127 TRUCKS)

APPENDIX E

RESULTS OF FOUR INSPECTION ROUNDS BY INDIVIDUAL TRUCK

Note: * on computer printout sheets indicates multiplier

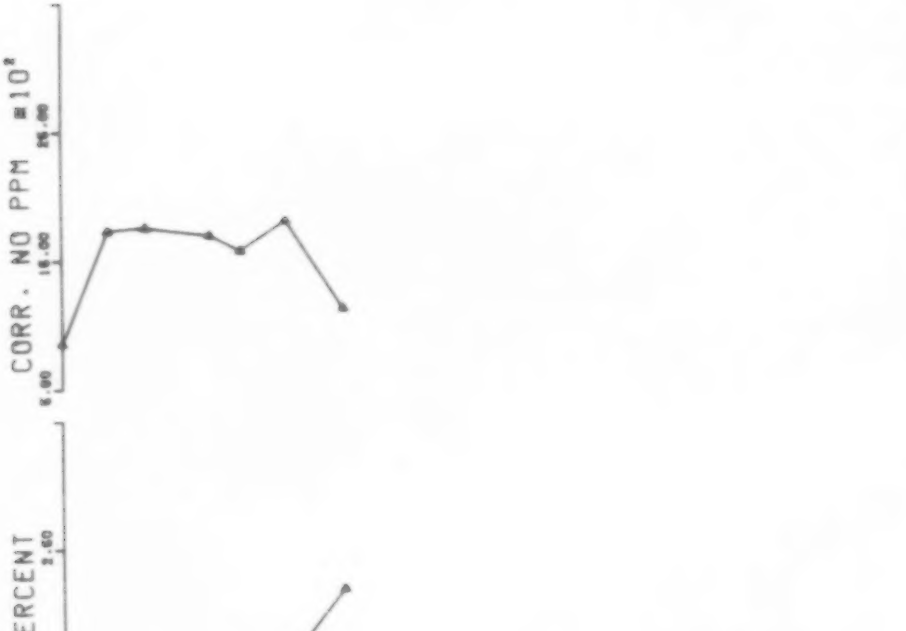

FIGURE E-1.UNIT 001   70 DODGE 10000 LB GVW VAN   318 CID V8 ENGINE

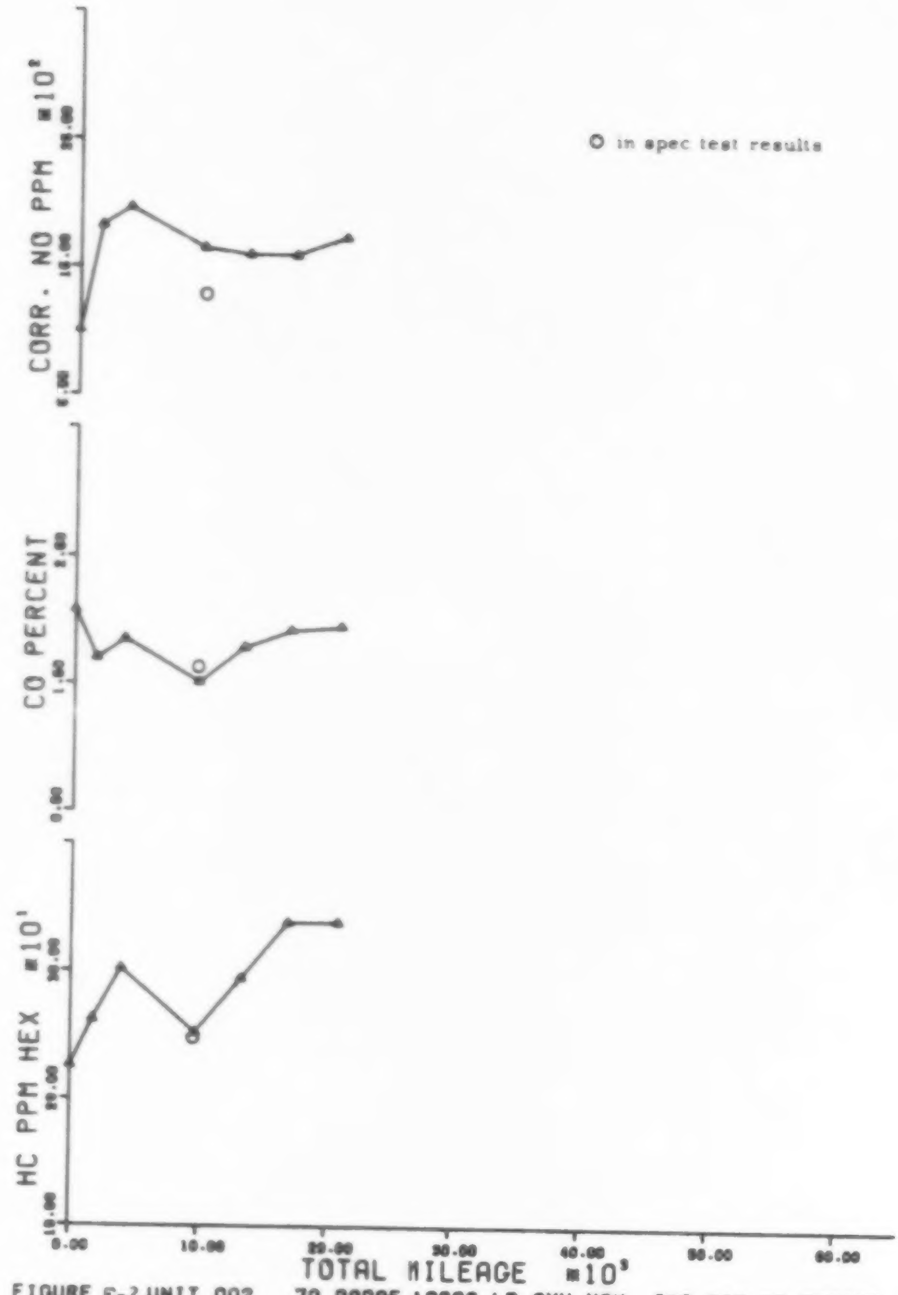

FIGURE E-2.UNIT 002   70 DODGE 10000 LB GVW VAN   318 CID V8 ENGINE

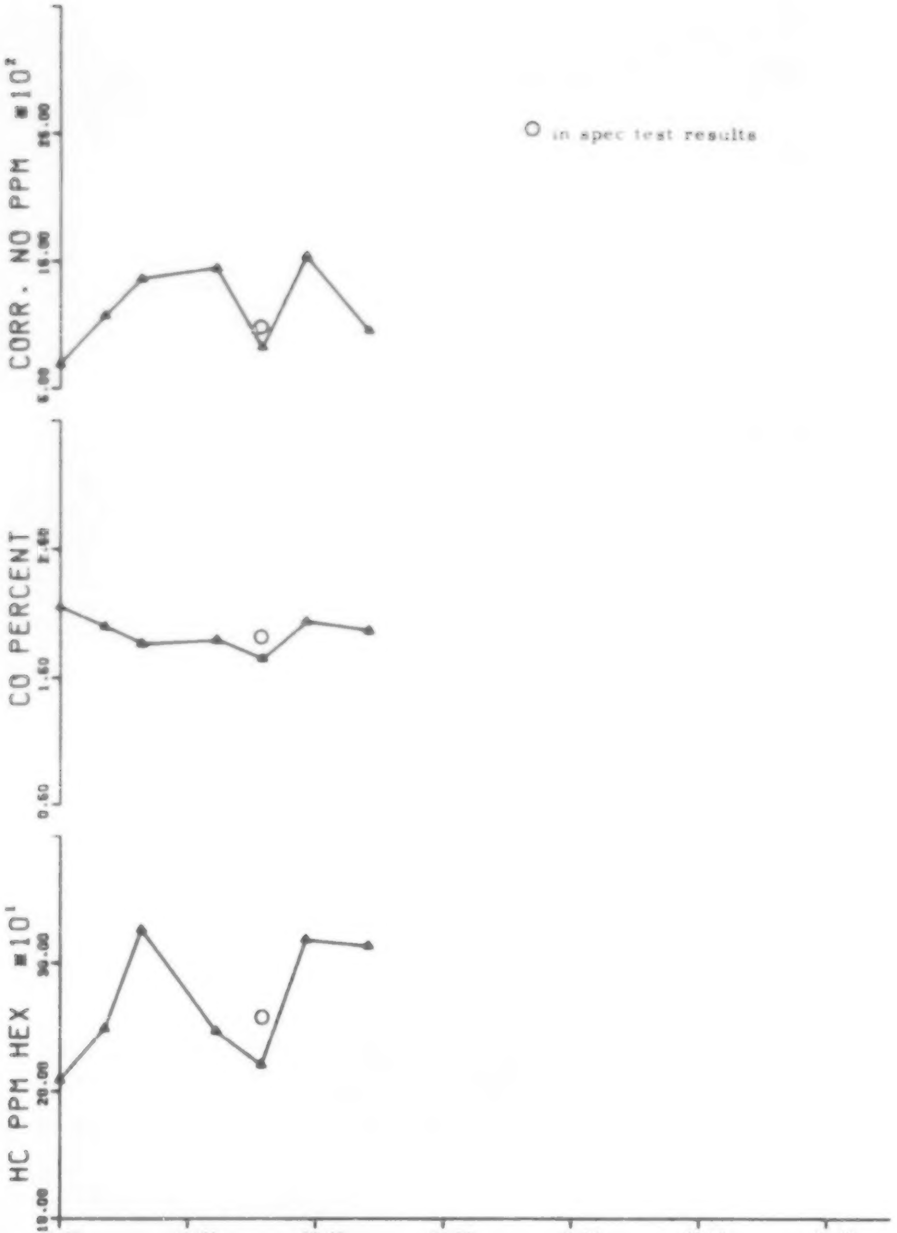

FIGURE E-3UNIT 003 70 DODGE 10000 LB GVW VAN 318 CID V8 ENGINE

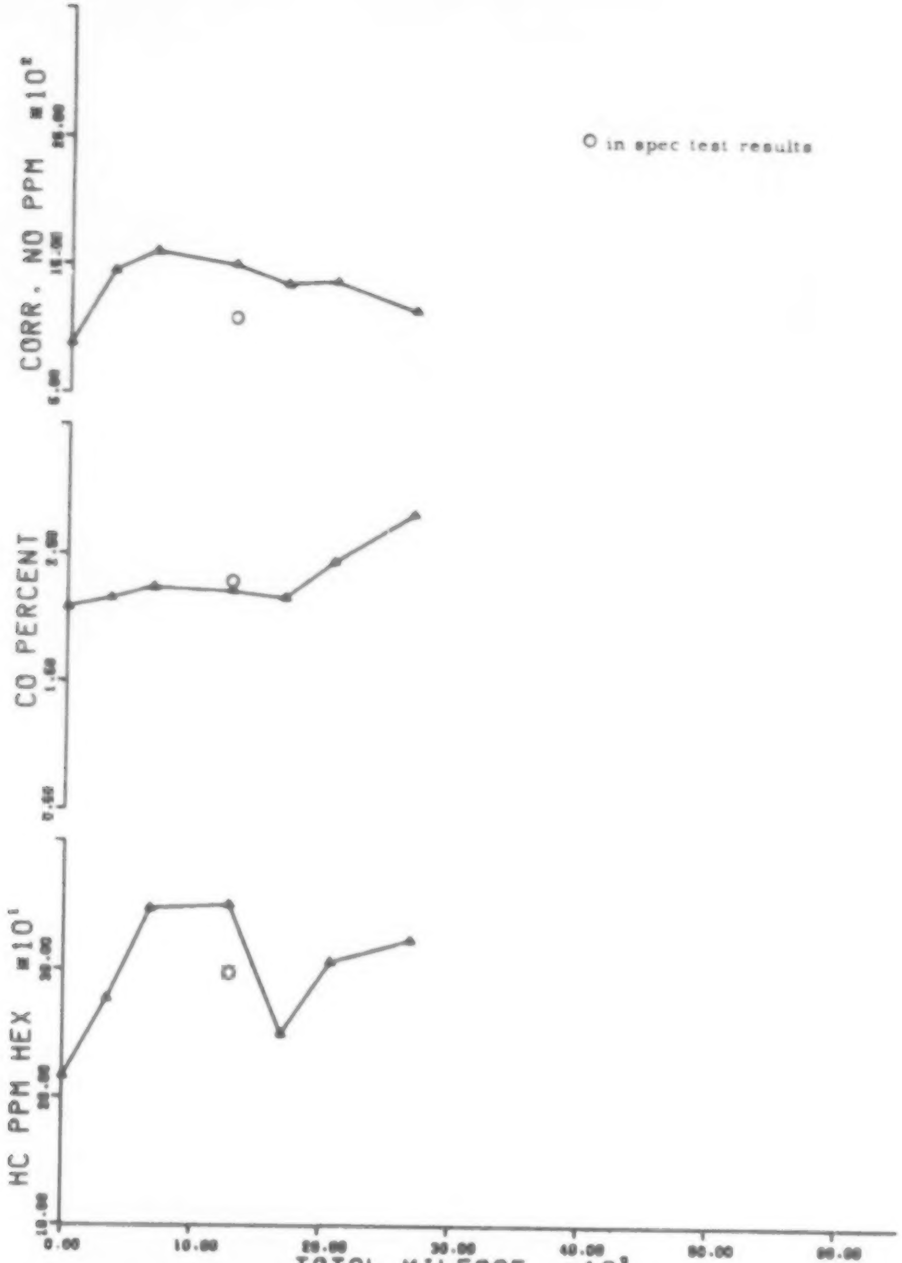

FIGURE E-4 UNIT 004 70 DODGE 10000 LB GVW VAN 318 CID V8 ENGINE

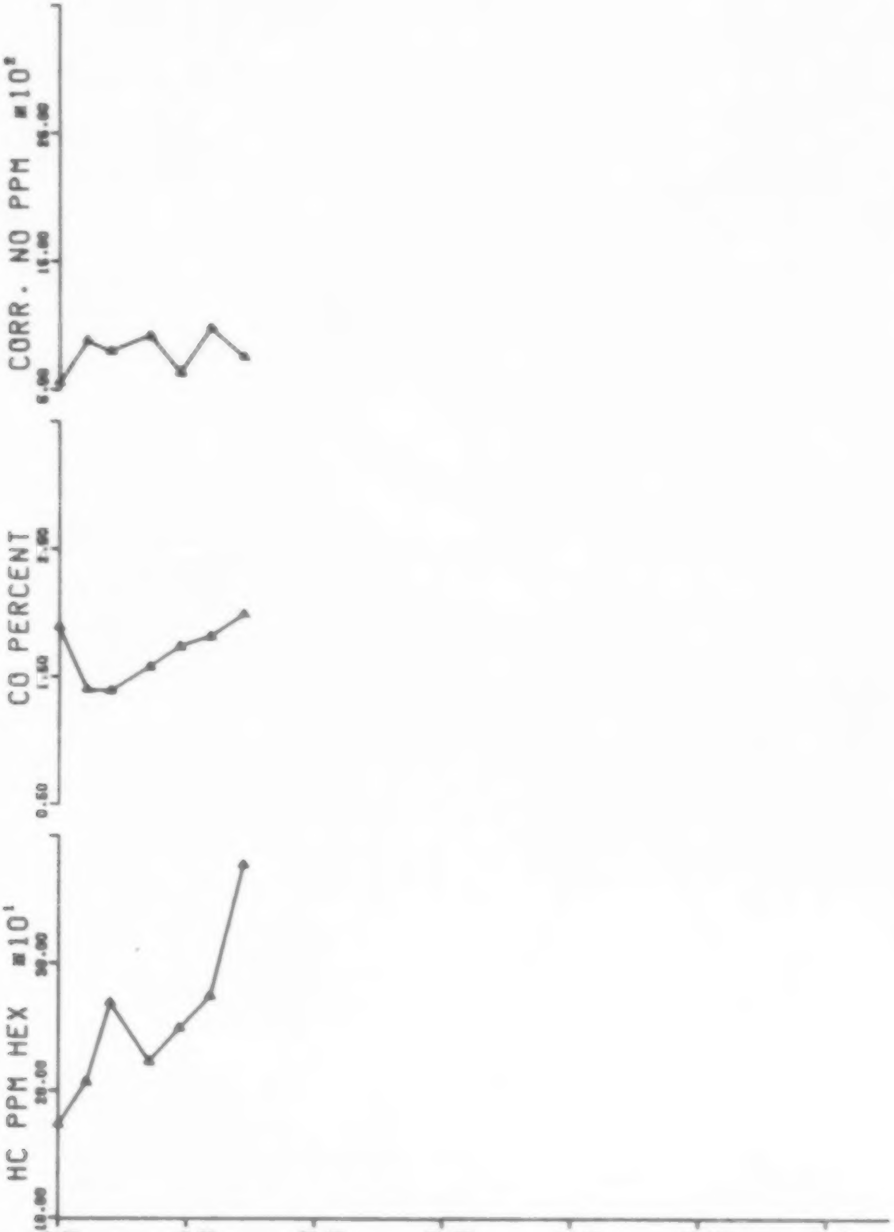

FIGURE E-5.UNIT 005 70 DODGE 10000 LB GVW VAN 318 CID V8 ENGINE

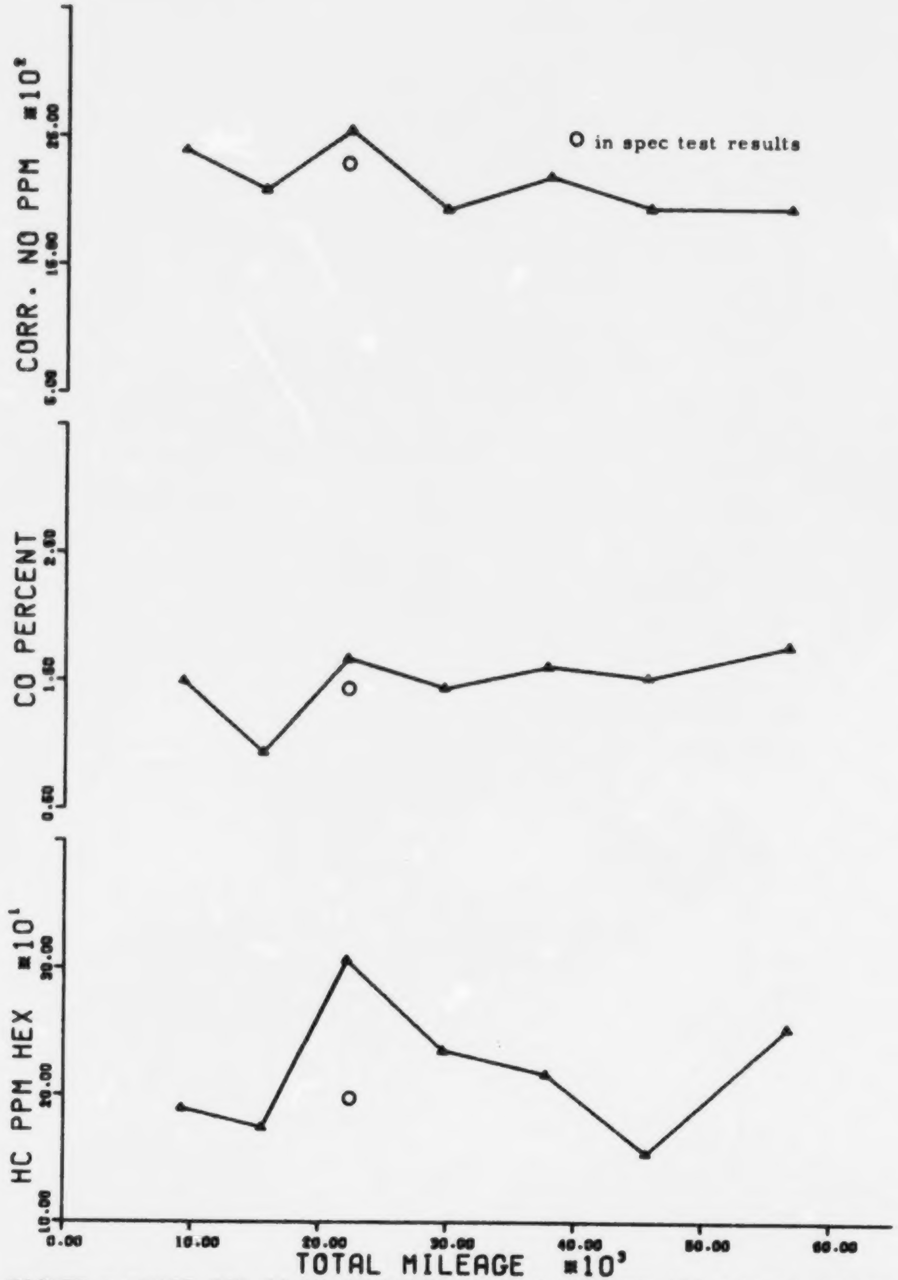

FIGURE E-6.UNIT 006 70 WHITE 30000 LB GVW TRACTOR.400 CID I6 ENGINE

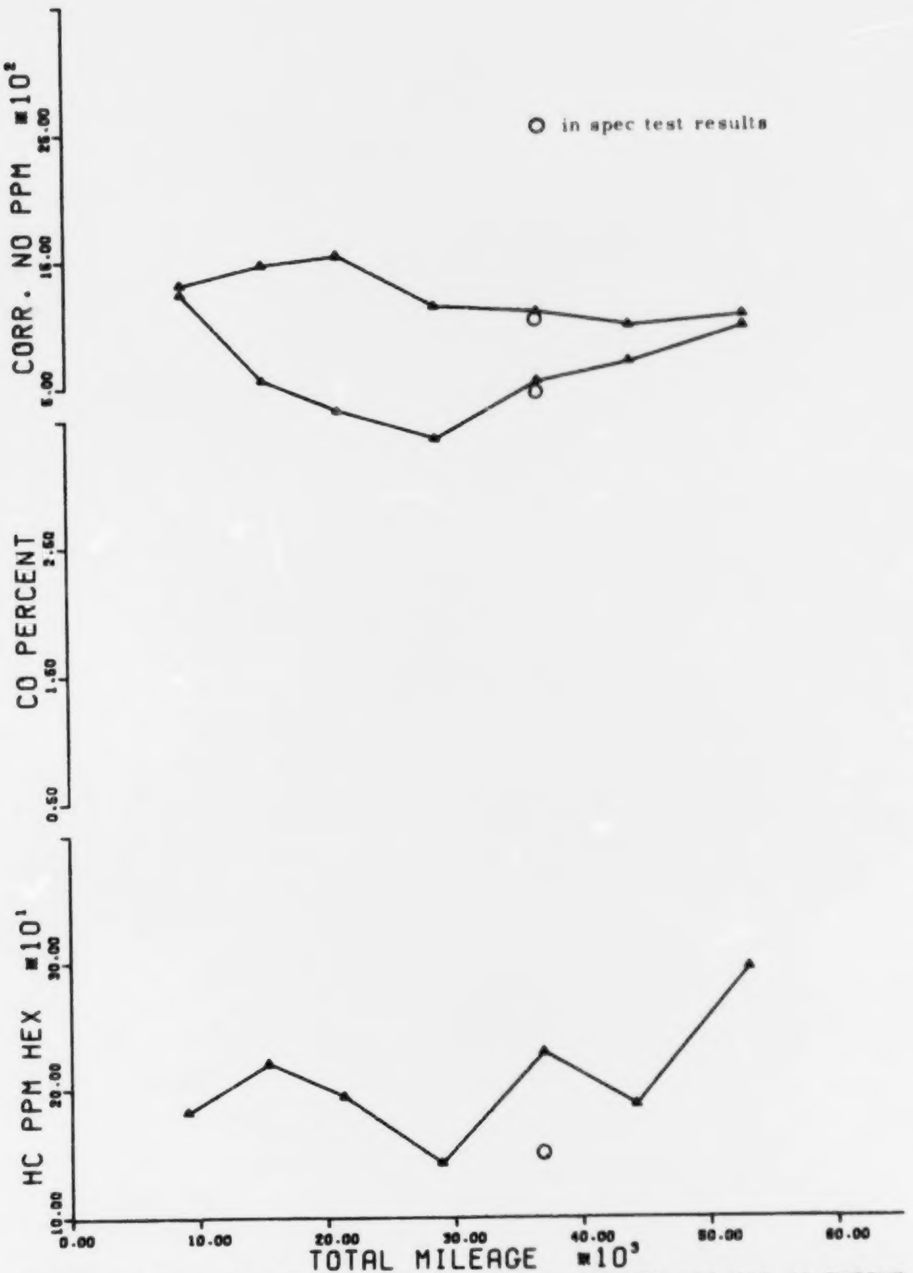

FIGURE E-7.UNIT 007 70 WHITE 30000 LB GVW TRACTOR.400 CID I6 ENGINE

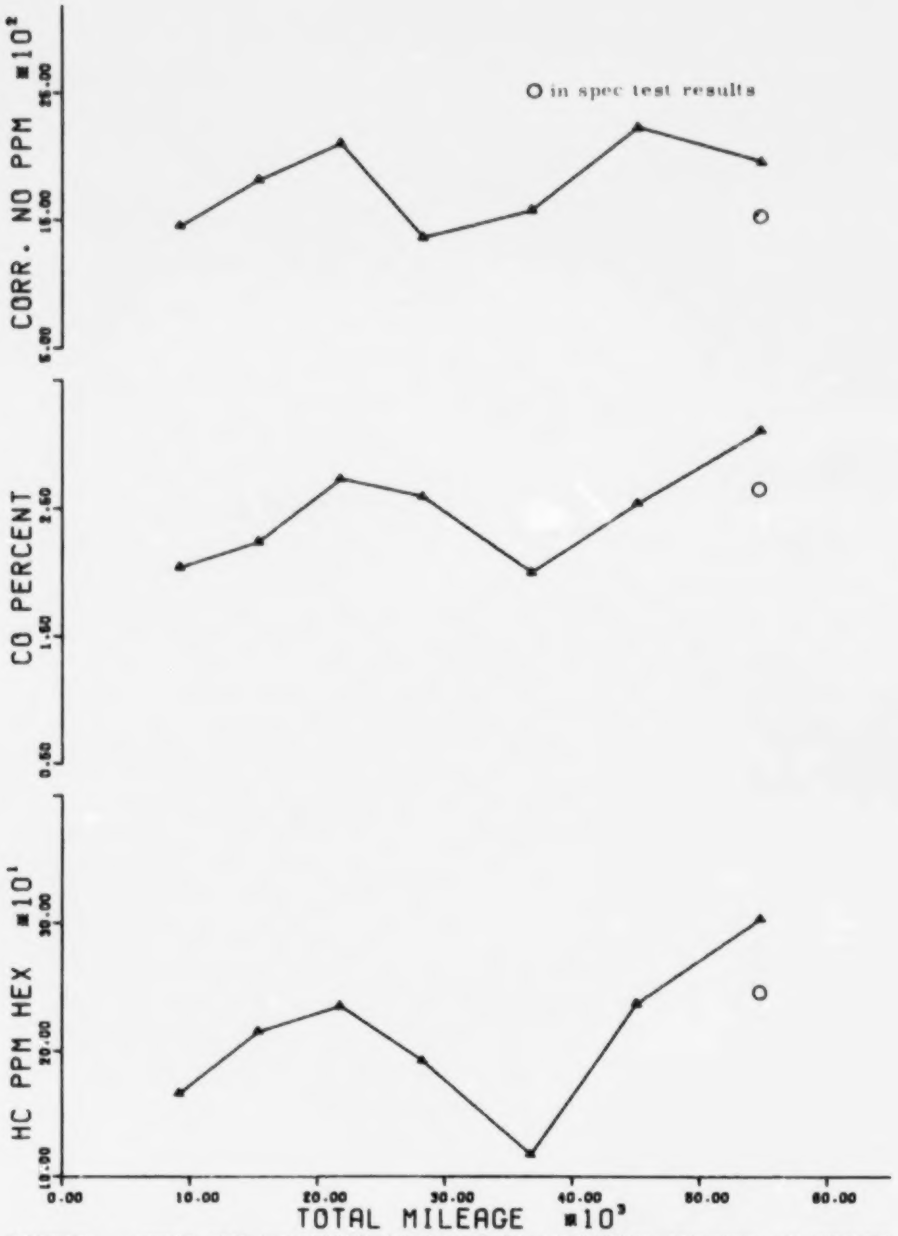

FIGURE E-8.UNIT 008 70 WHITE 30000 LB GVW TRACTOR.400 CID I6 ENGINE

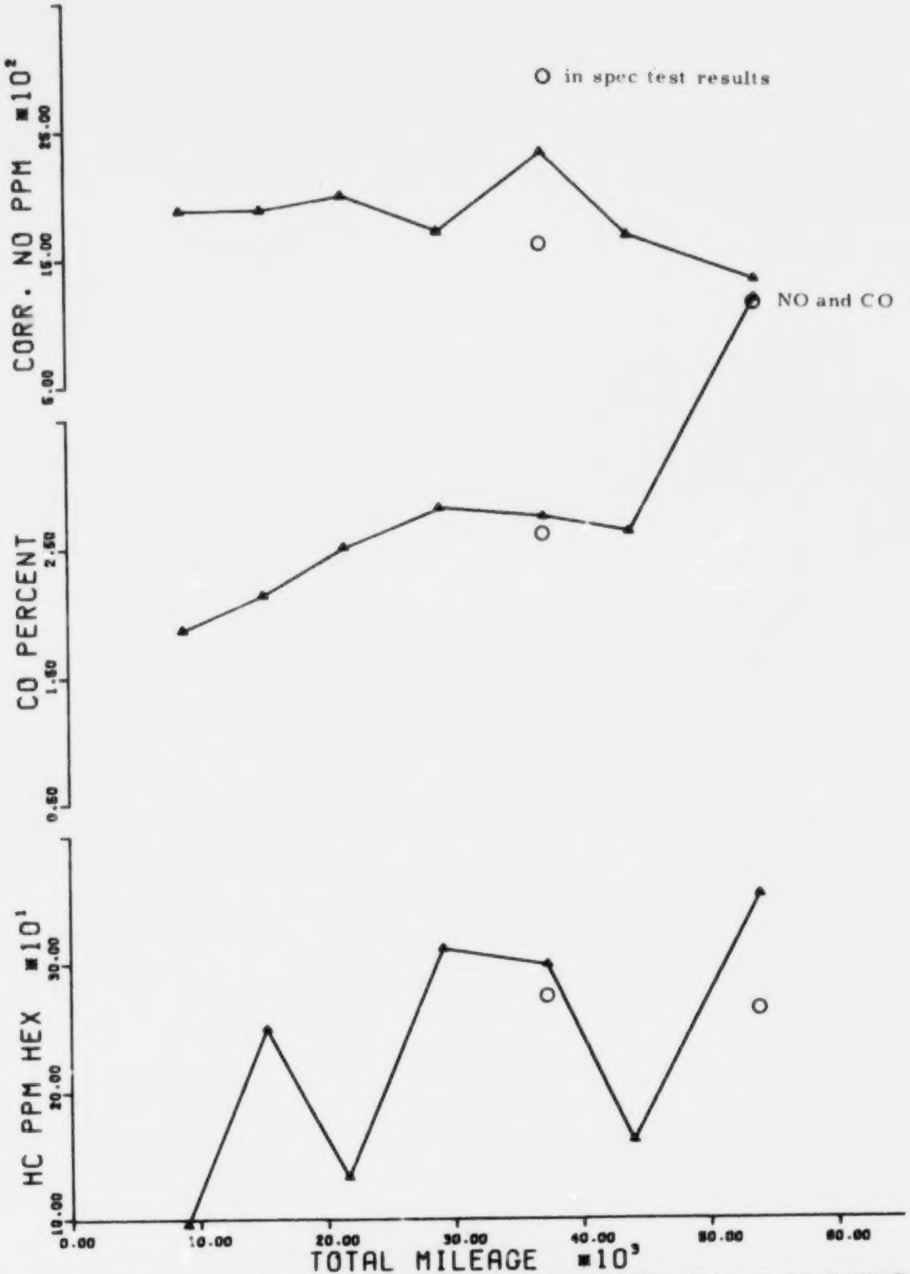

FIGURE E-9.UNIT 009 70 WHITE 30000 LB GVW TRACTOR.400 CID I6 ENGINE

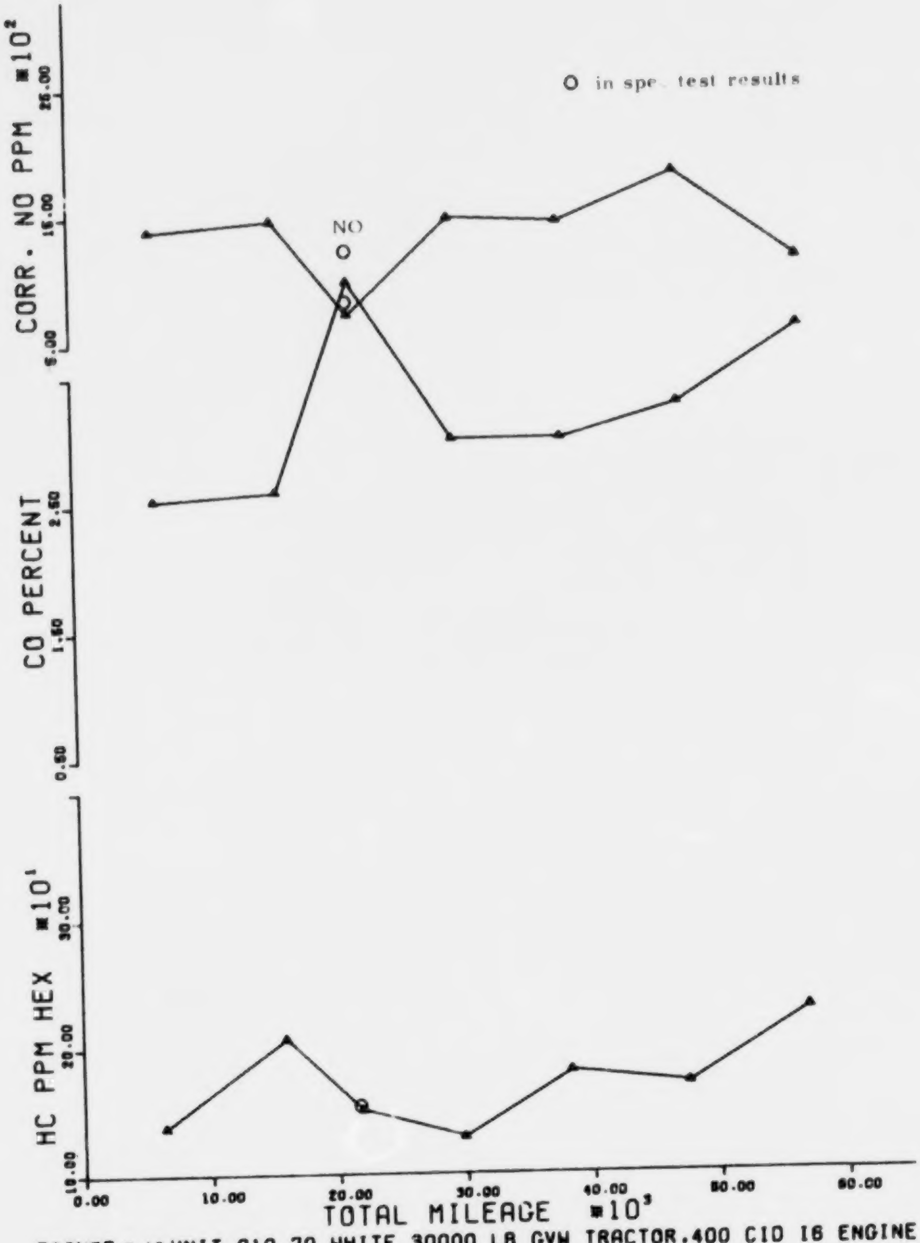

FIGURE E-10.UNIT 010 70 WHITE 30000 LB GVW TRACTOR.400 CID I6 ENGINE

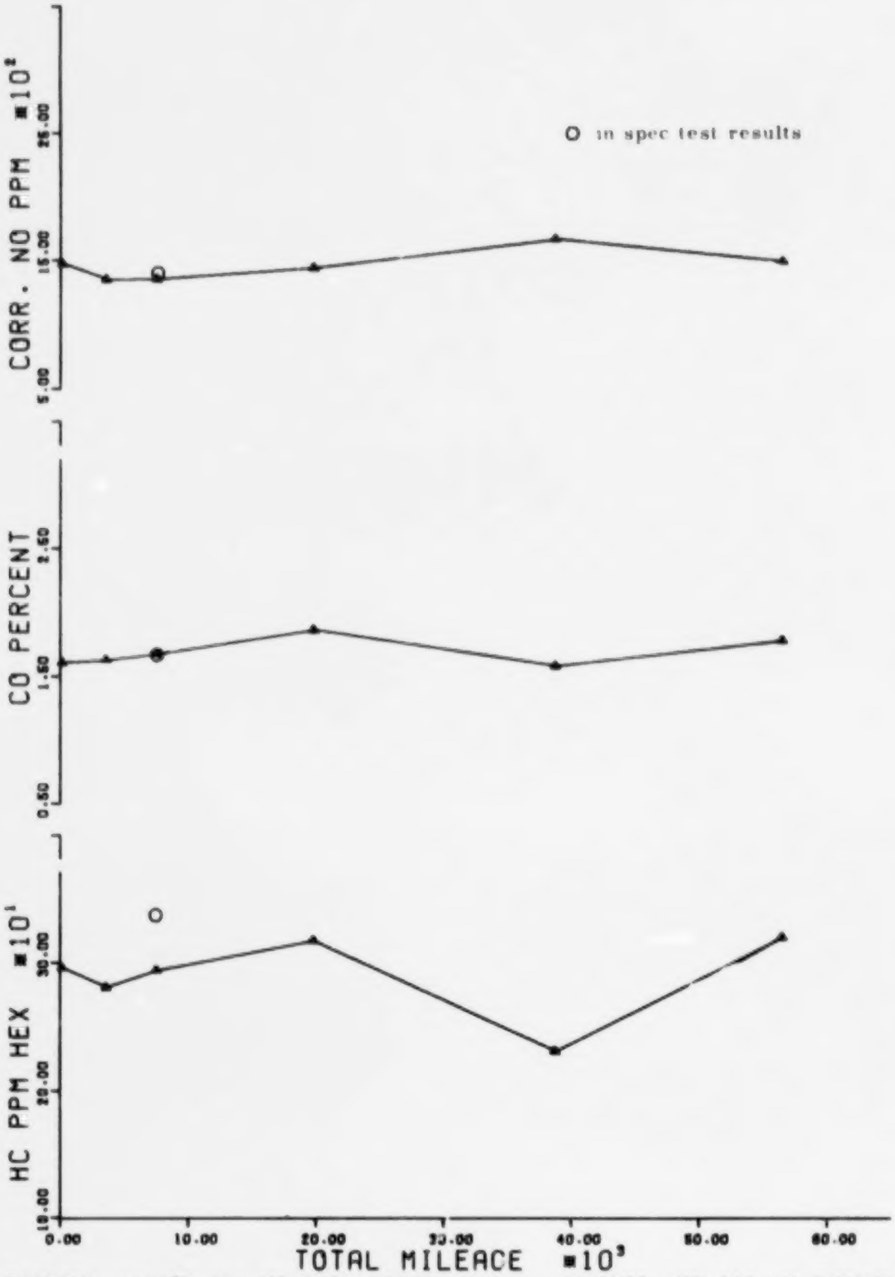

FIGURE E-11. UNIT 011 70 IHC 32000 LB GVW TRACTOR.478 CID V8 ENGINE

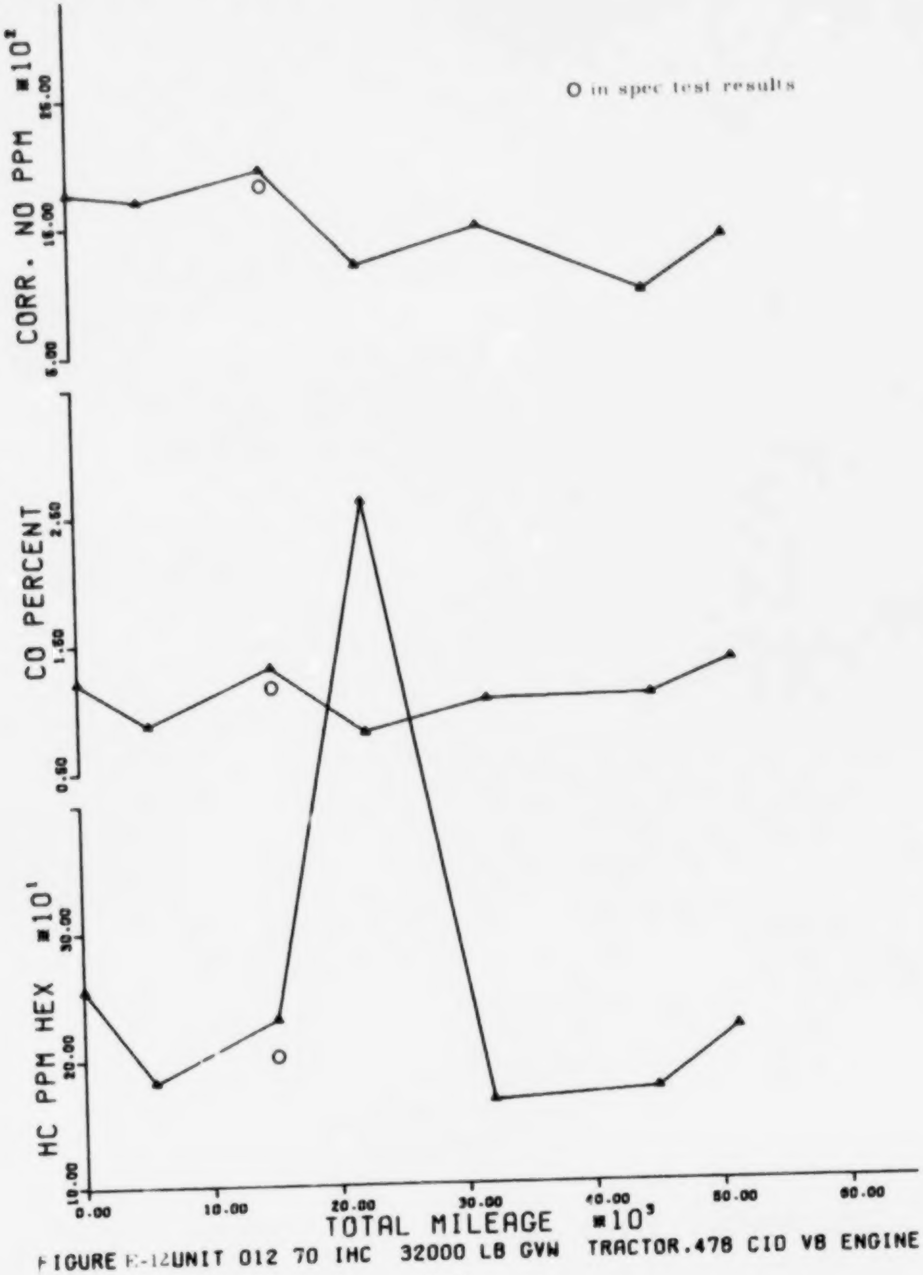

FIGURE E-12UNIT 012 70 IHC 32000 LB GVW TRACTOR.478 CID V8 ENGINE

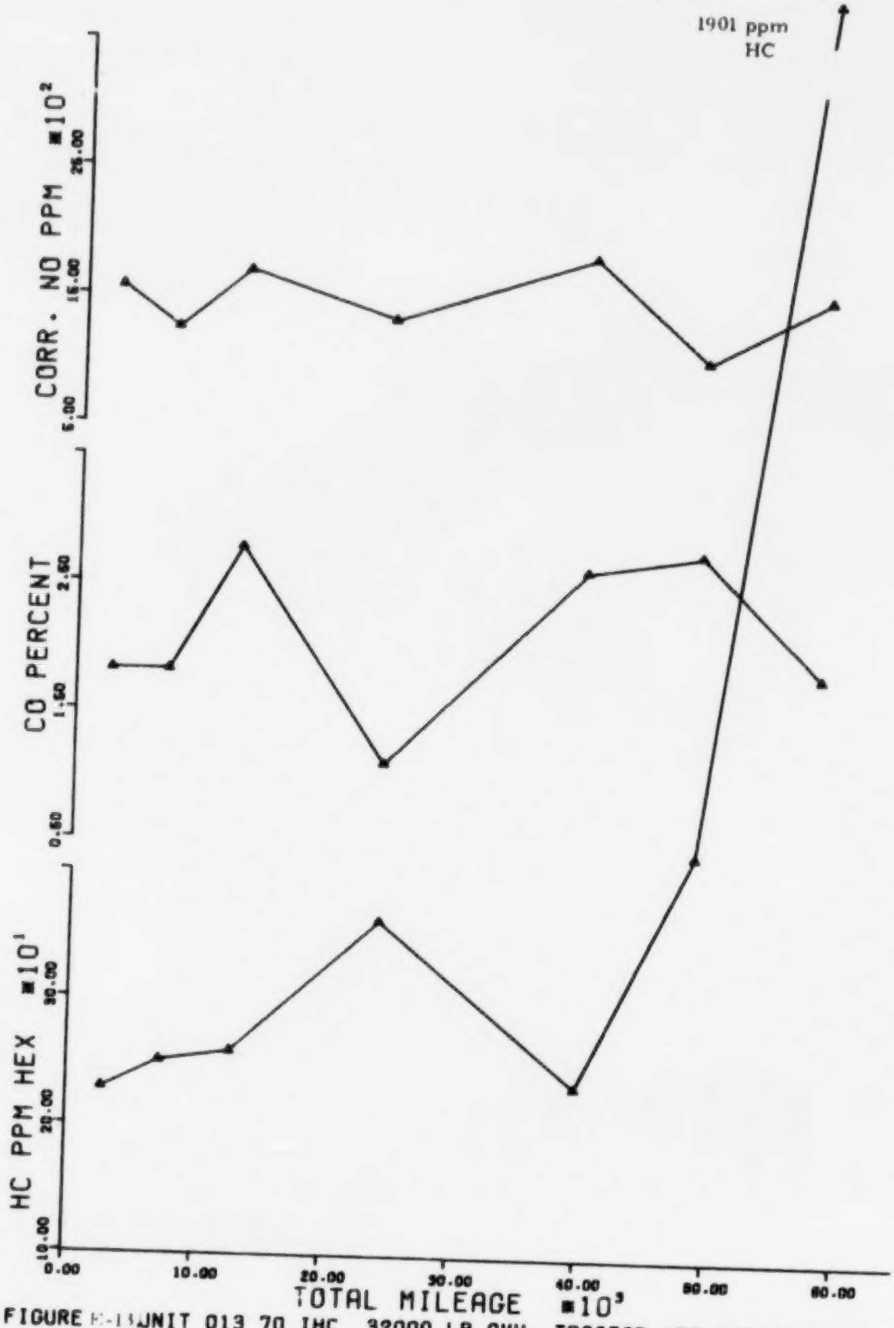

FIGURE E-13 UNIT 013 70 IHC 32000 LB GVW TRACTOR.478 CID V8 ENGINE

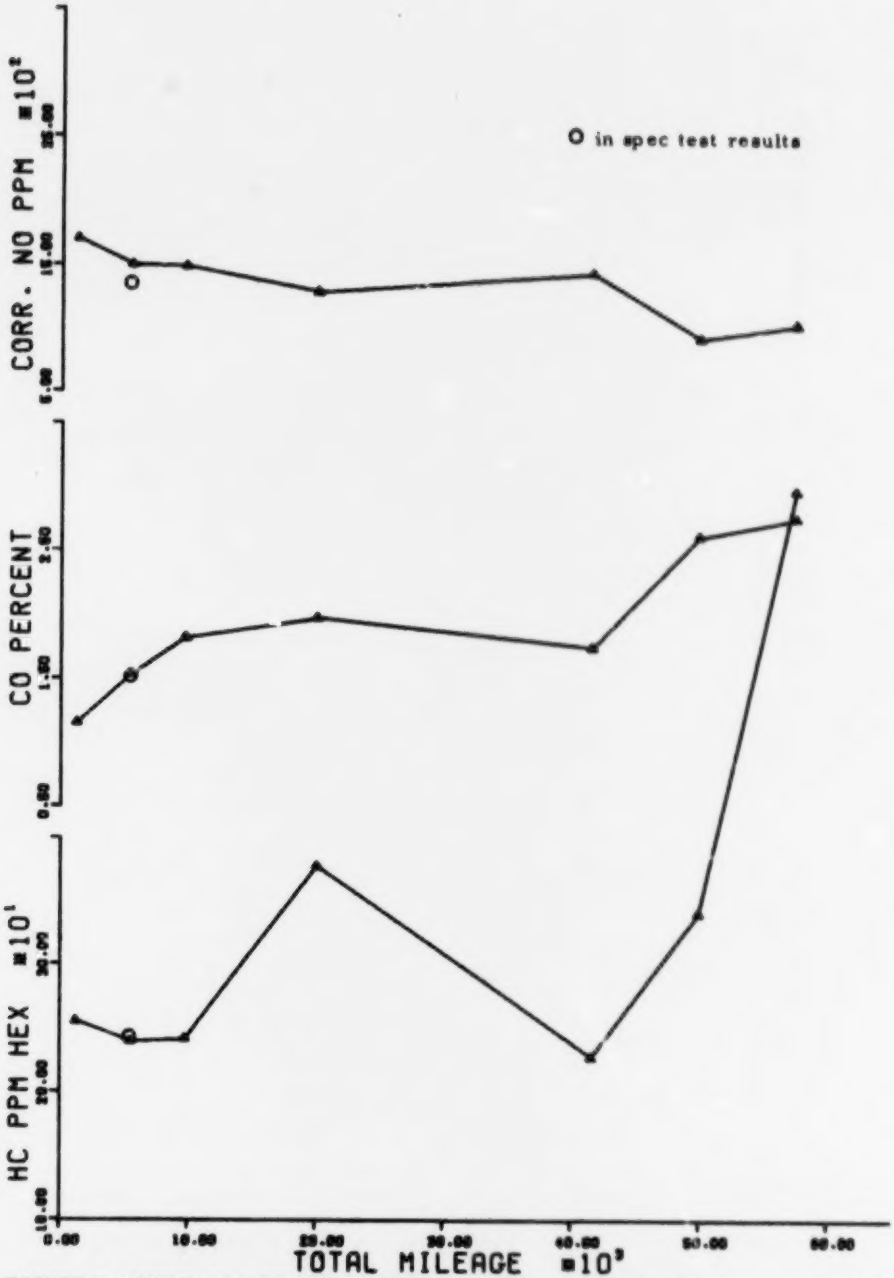

FIGURE E-14UNIT 014 70 INC 32000 LB GVW TRACTOR.478 CID V8 ENGINE

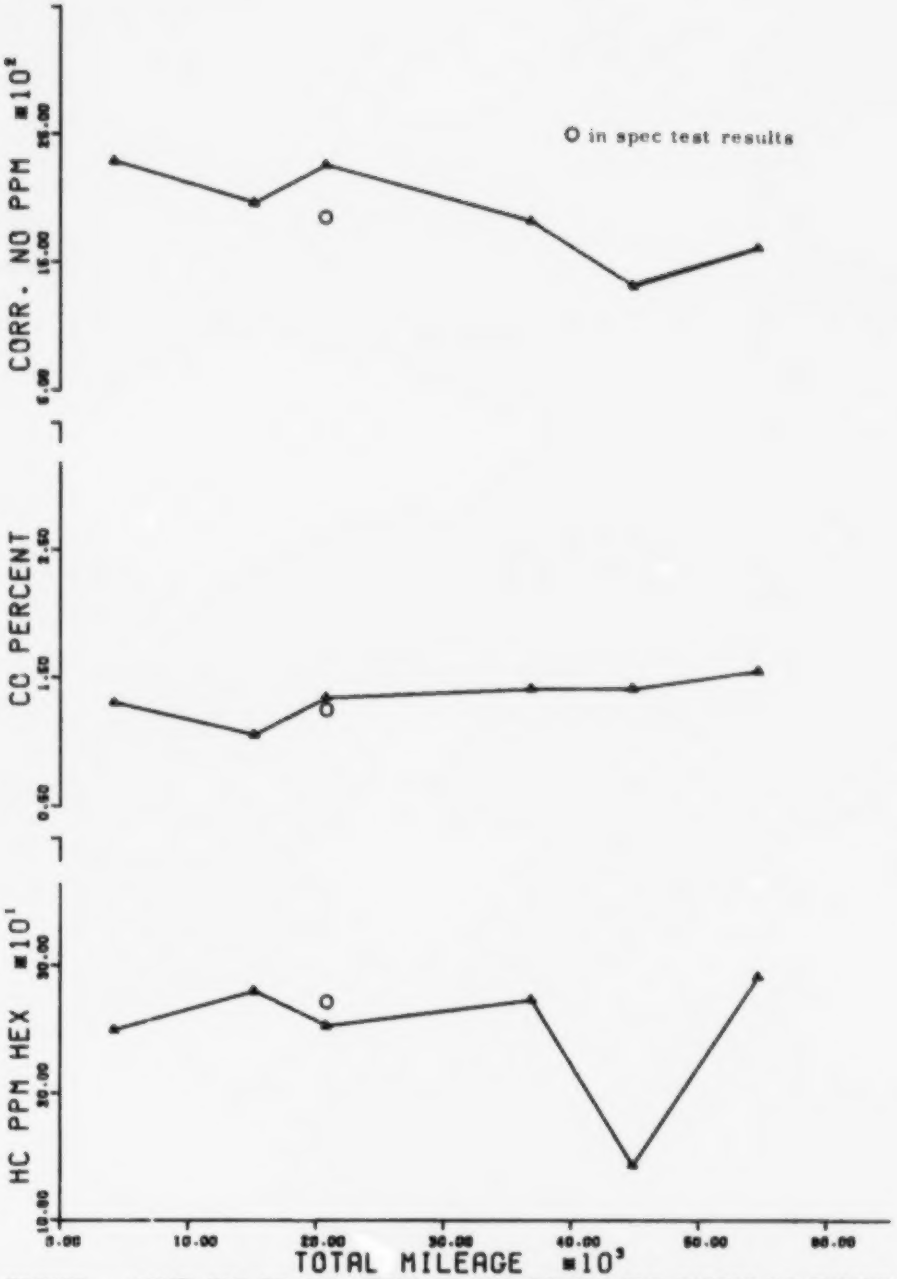

FIGURE E-15 UNIT 015 70 IHC 25500 LB GVW SCHOOL BUS 345CID V8 ENGINE

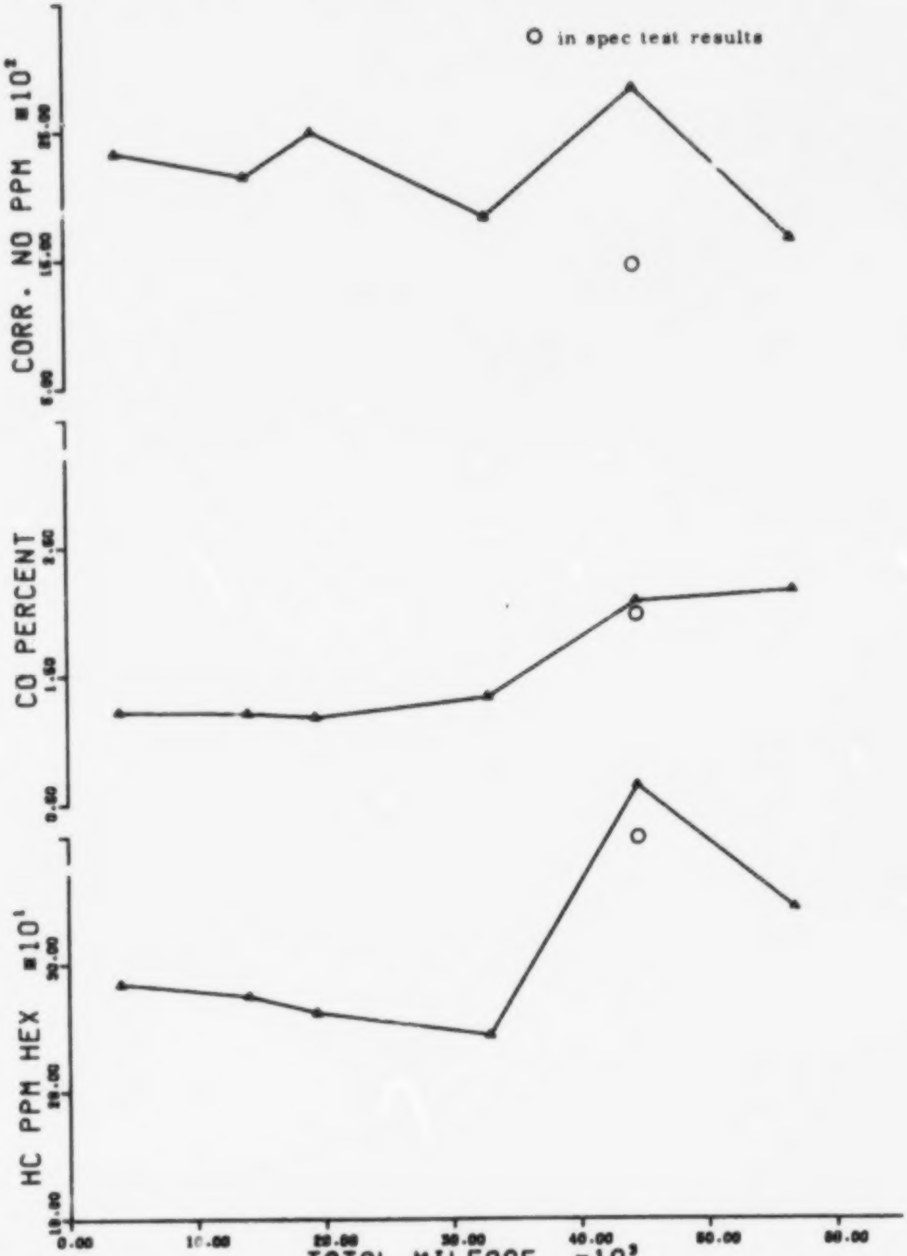

FIGURE E-16 UNIT 016 70 IHC 25500 LB GVW SCHOOL BUS 345CID V8 ENGINE

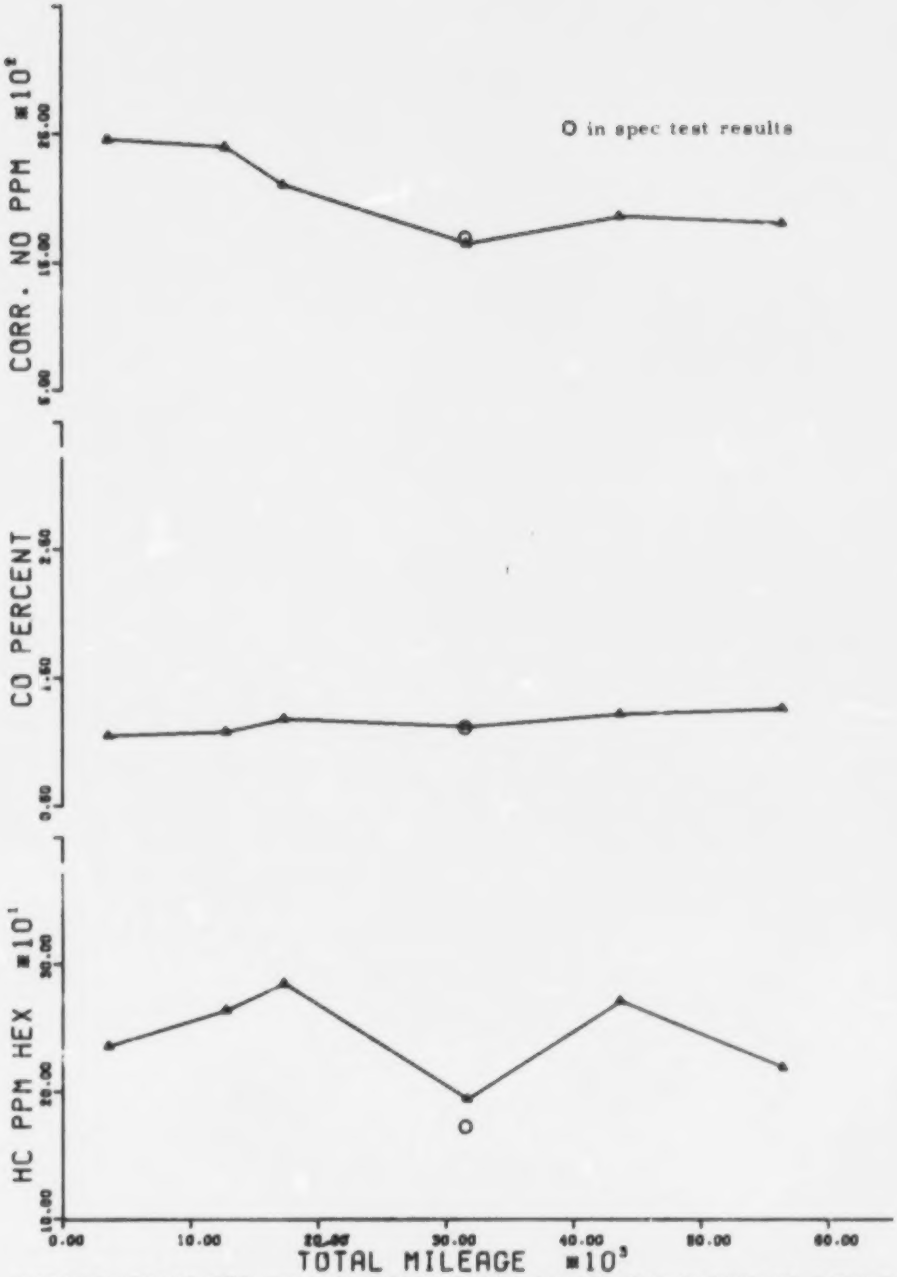

FIGURE E-17 UNIT 017 70 IHC 25500 LB GVW SCHOOL BUS 345CID V8 ENGINE

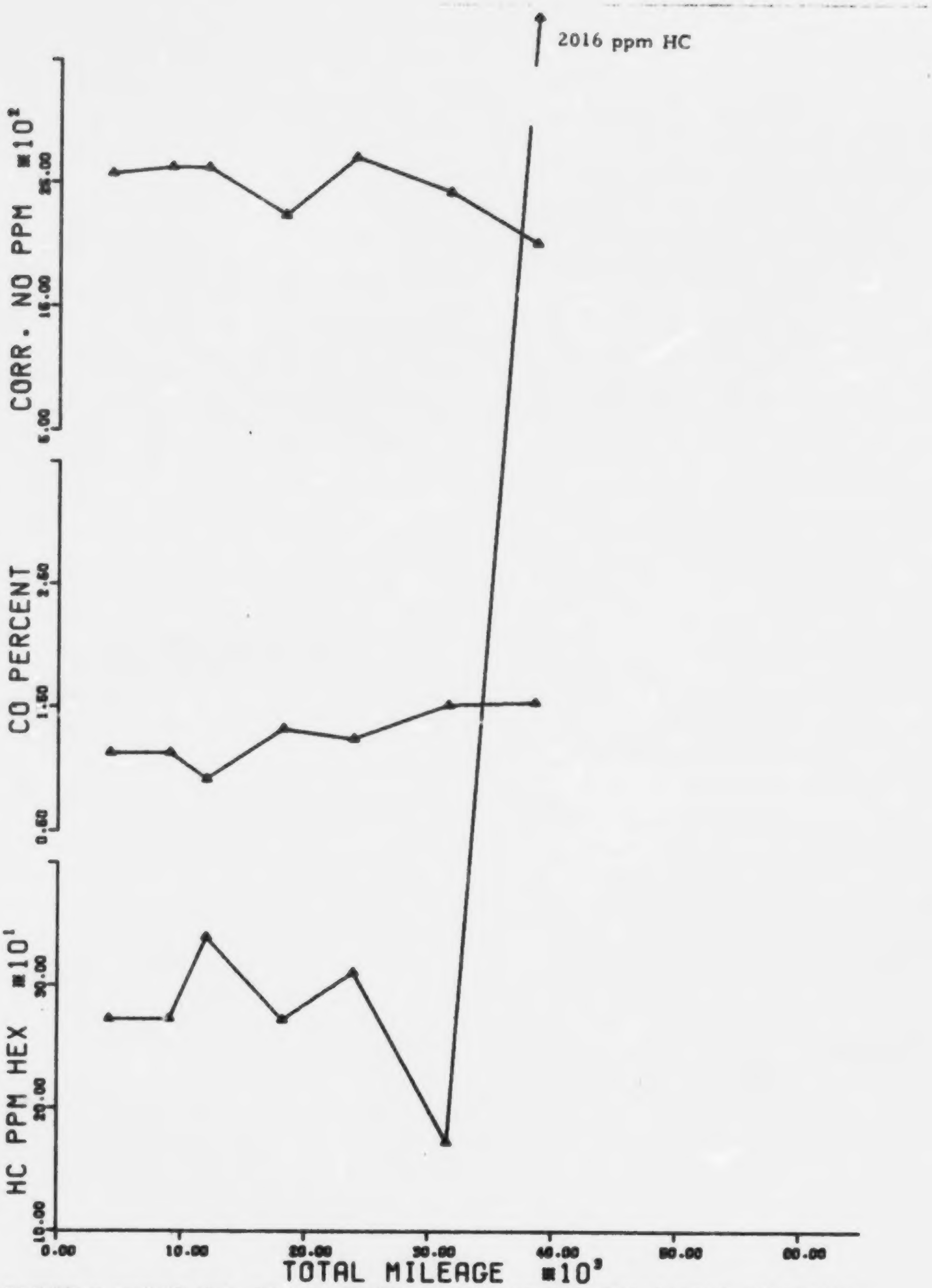

FIGURE E-18 UNIT 018 70 IHC 22000 LB GVW SCHOOL BUS 345CID V8 ENGINE

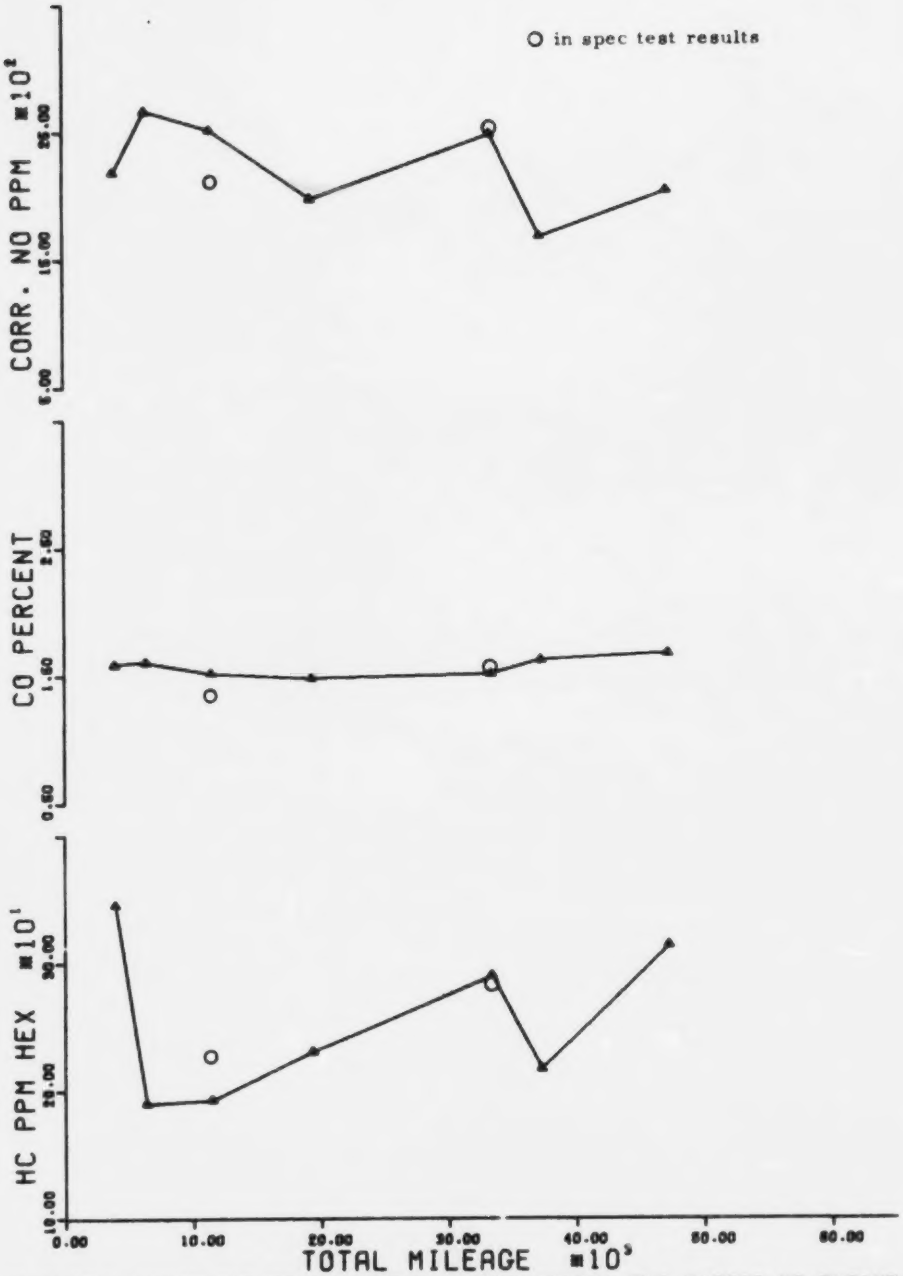

FIGURE E-19 UNIT 018 70 IHC 22000 LB GVW SCHOOL BUS 345CID V8 ENGINE

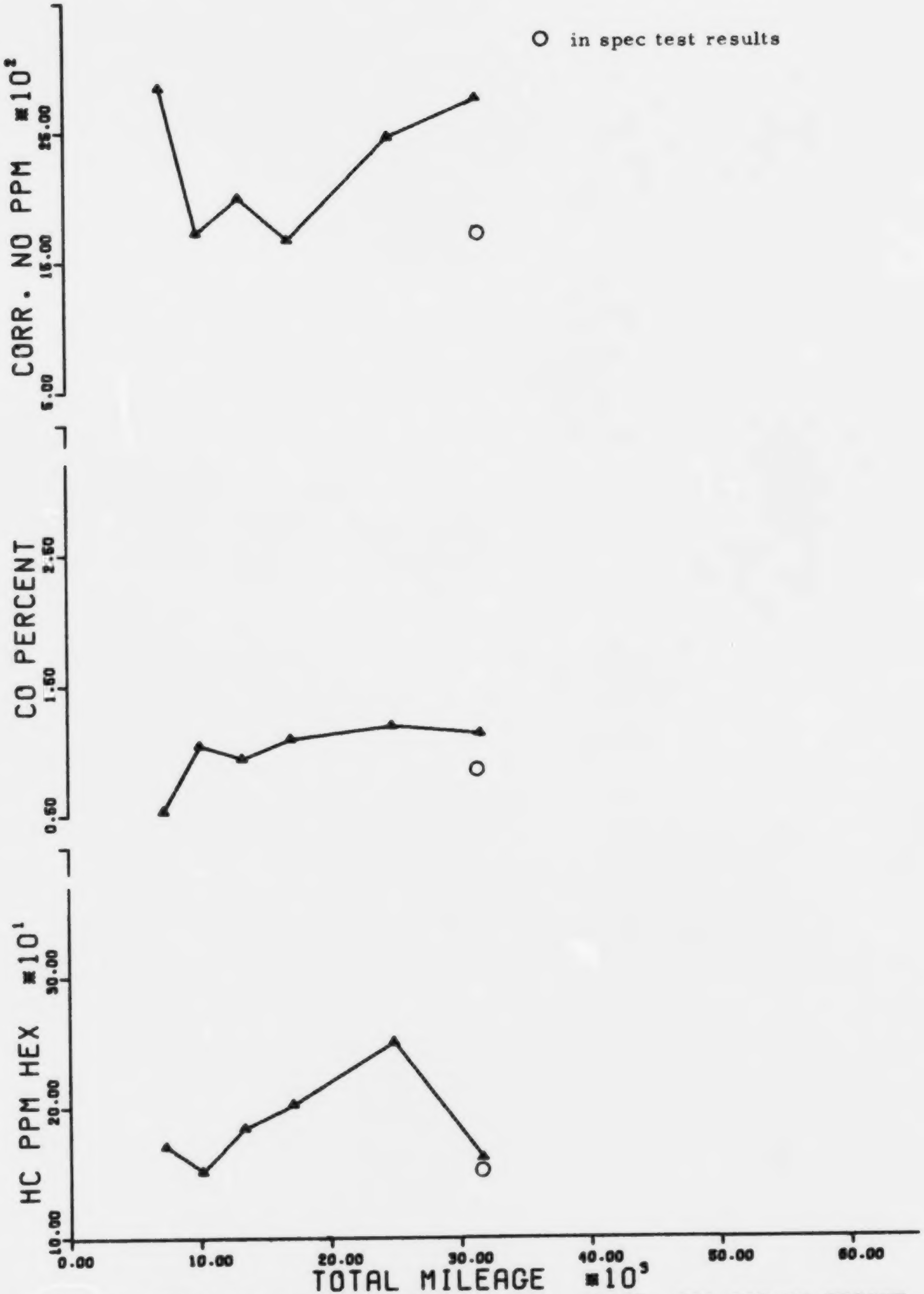

FIGURE E-20 ~~UNIT~~ 020 70 FORD 10000 LB GVW STAKE 300 CID I6 ENGINE

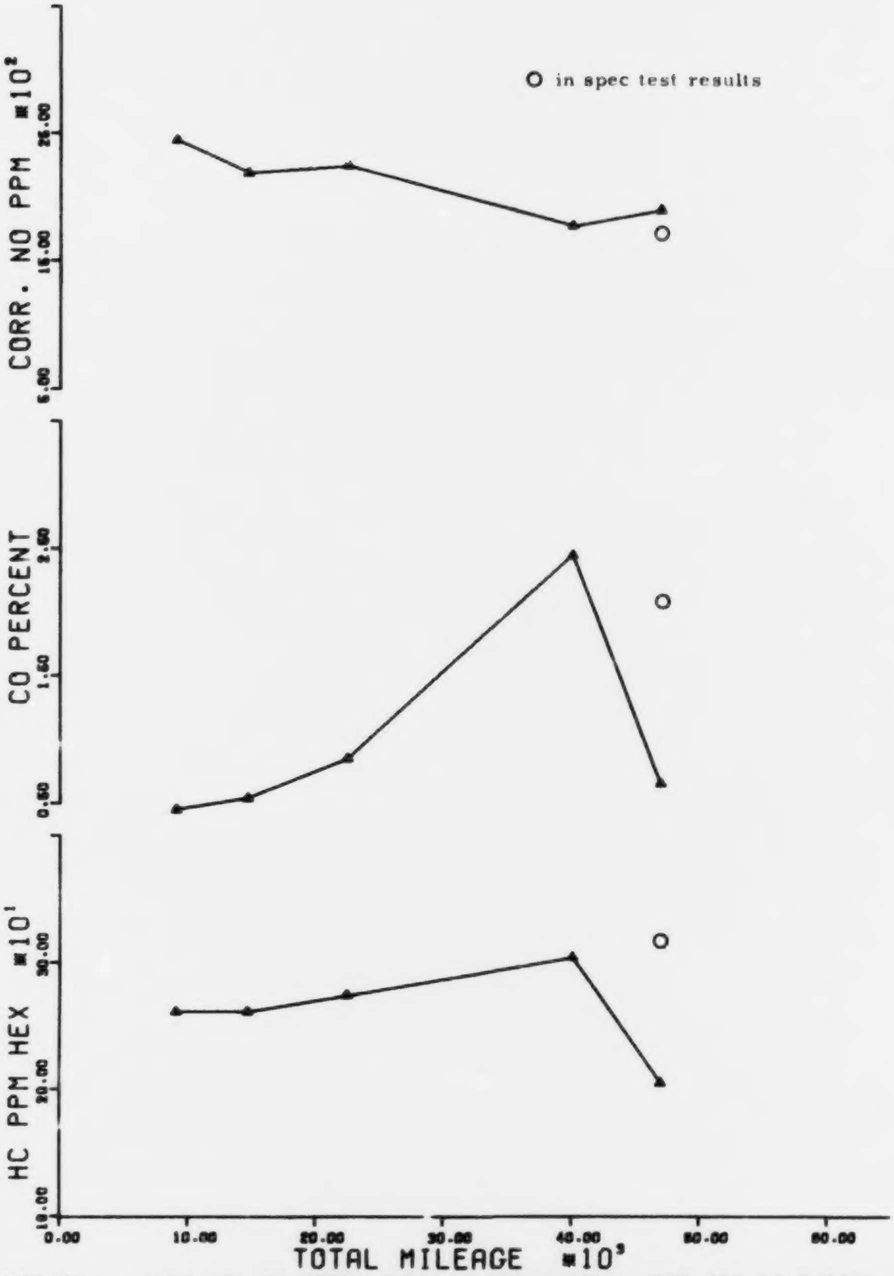

FIGURE E-21. UNIT 021 70 FORD 7500 LB GVW PICKUP 240 CID I6 ENGINE

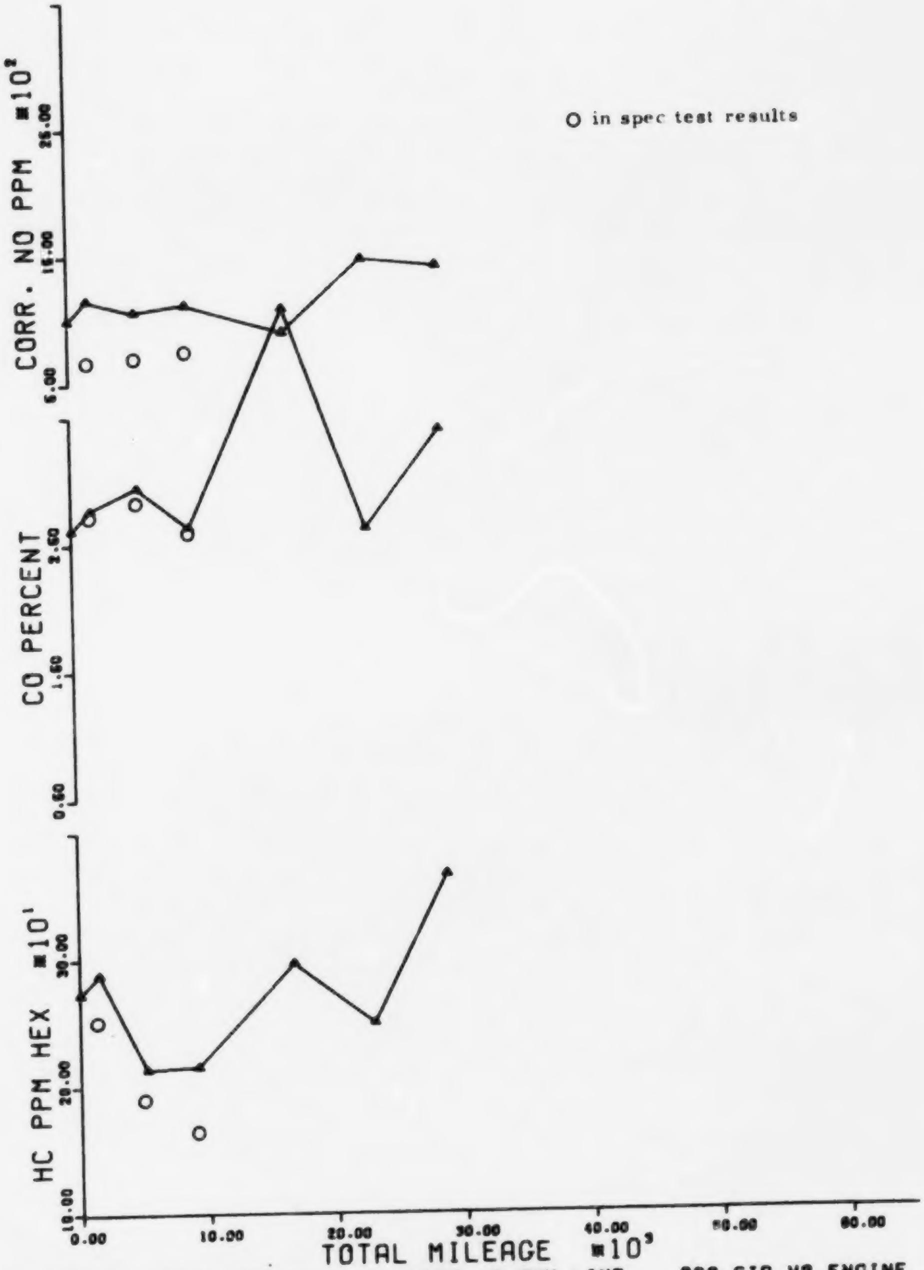

FIGURE E-22UNIT 022 71 IHC 25500 LB GVW LINE 392 CID V8 ENGINE

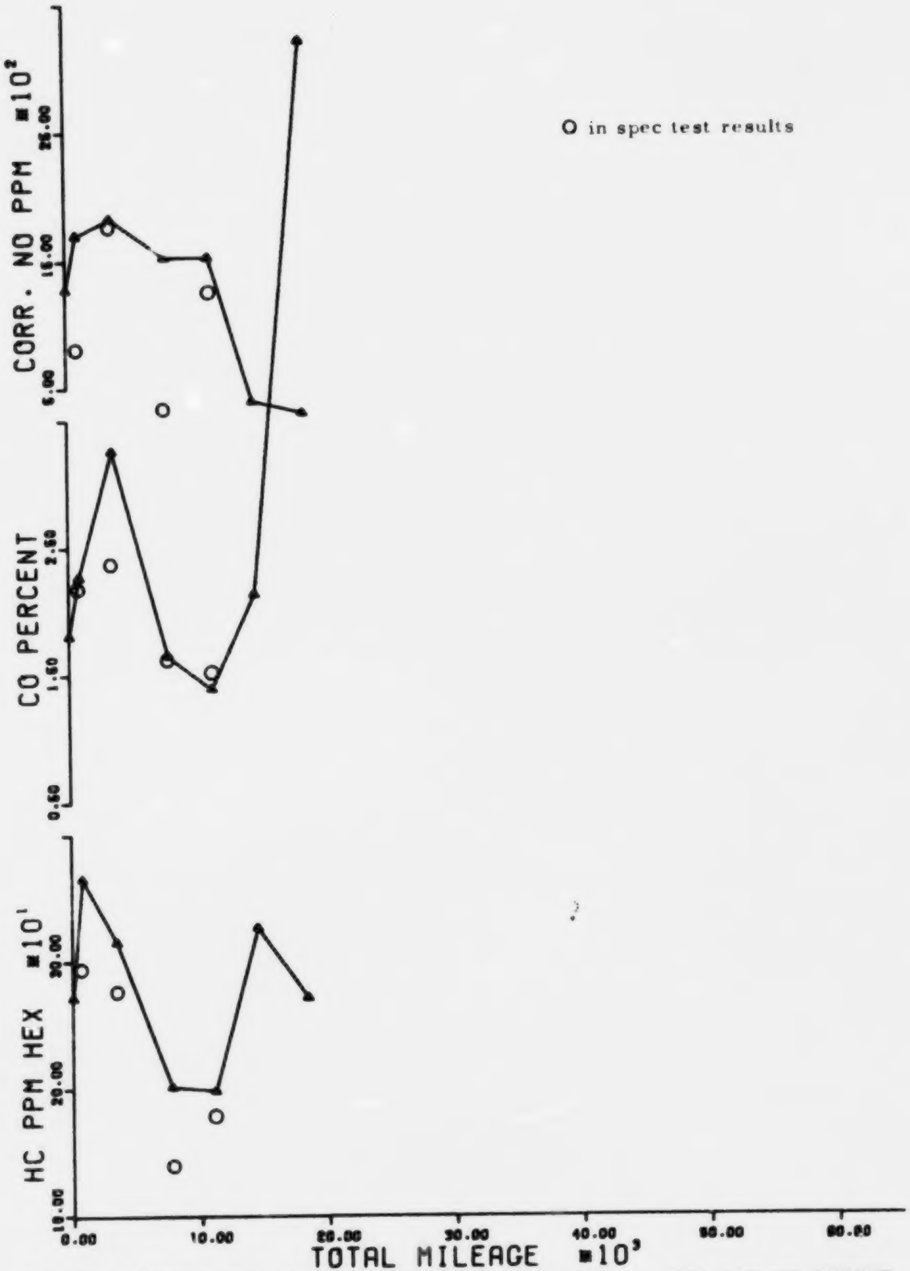

FIGURE E-23UNIT 023 70 IHC 25500 LB GVW LINE 392 CID V8 ENGINE

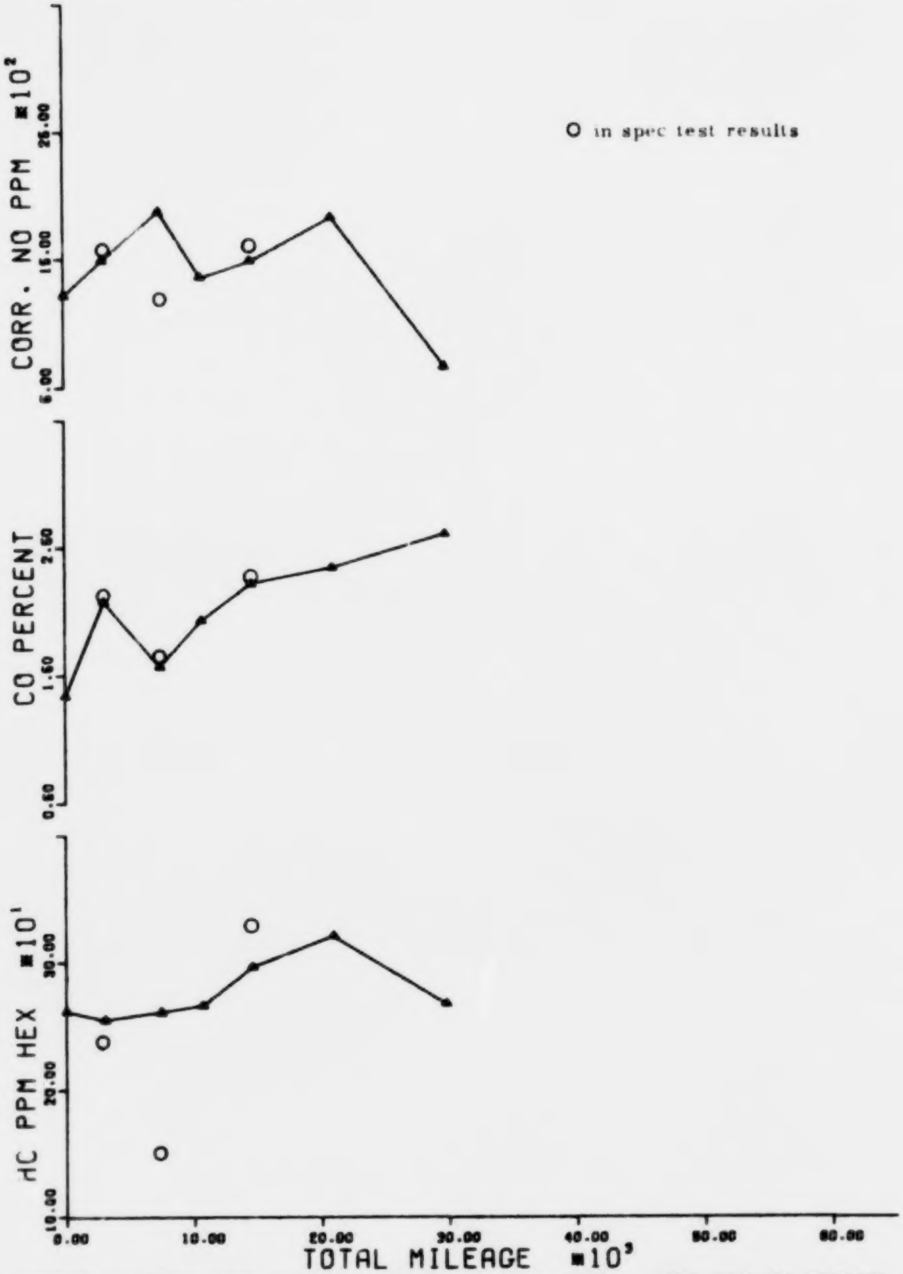

FIGURE E-24UNIT 024 71 IHC 25500 LB GVW LINE 392 CID V8 ENGINE

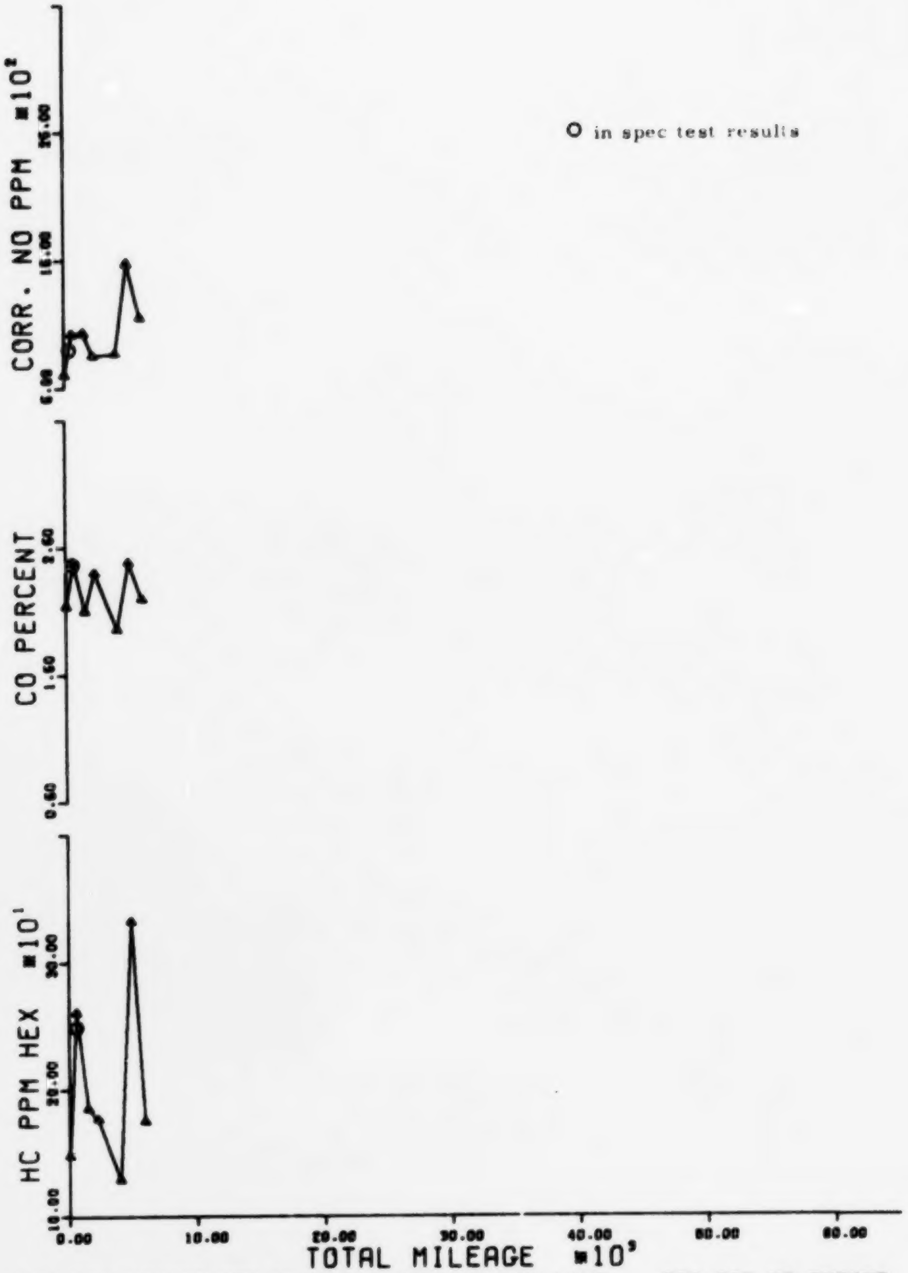

FIGURE E-25 UNIT 025 71 IHC 25500 LB GVW LINE 392 CID V8 ENGINE

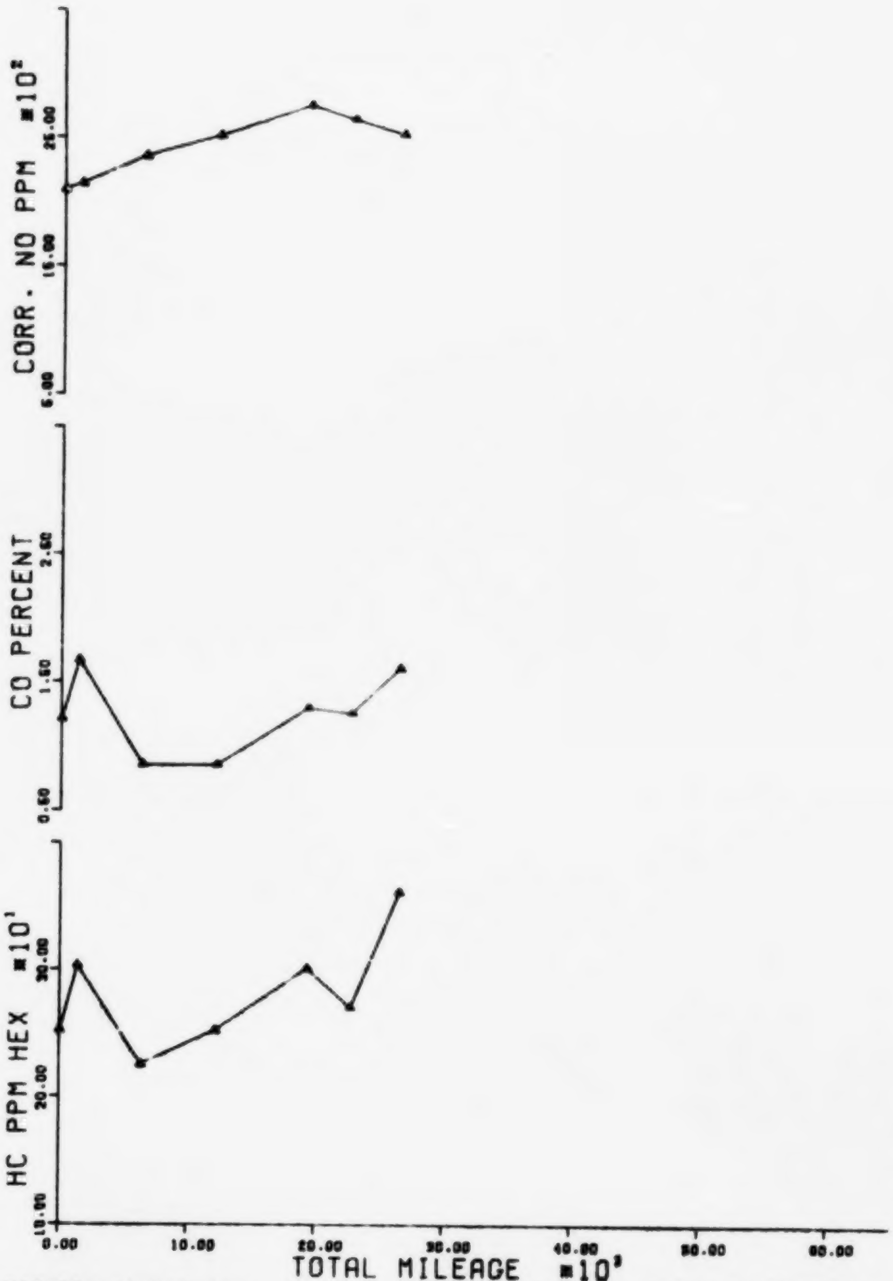

FIGURE E-26 UNIT 026 71 IHC 14000 LB GVW VAN 304 CID V8 ENGINE

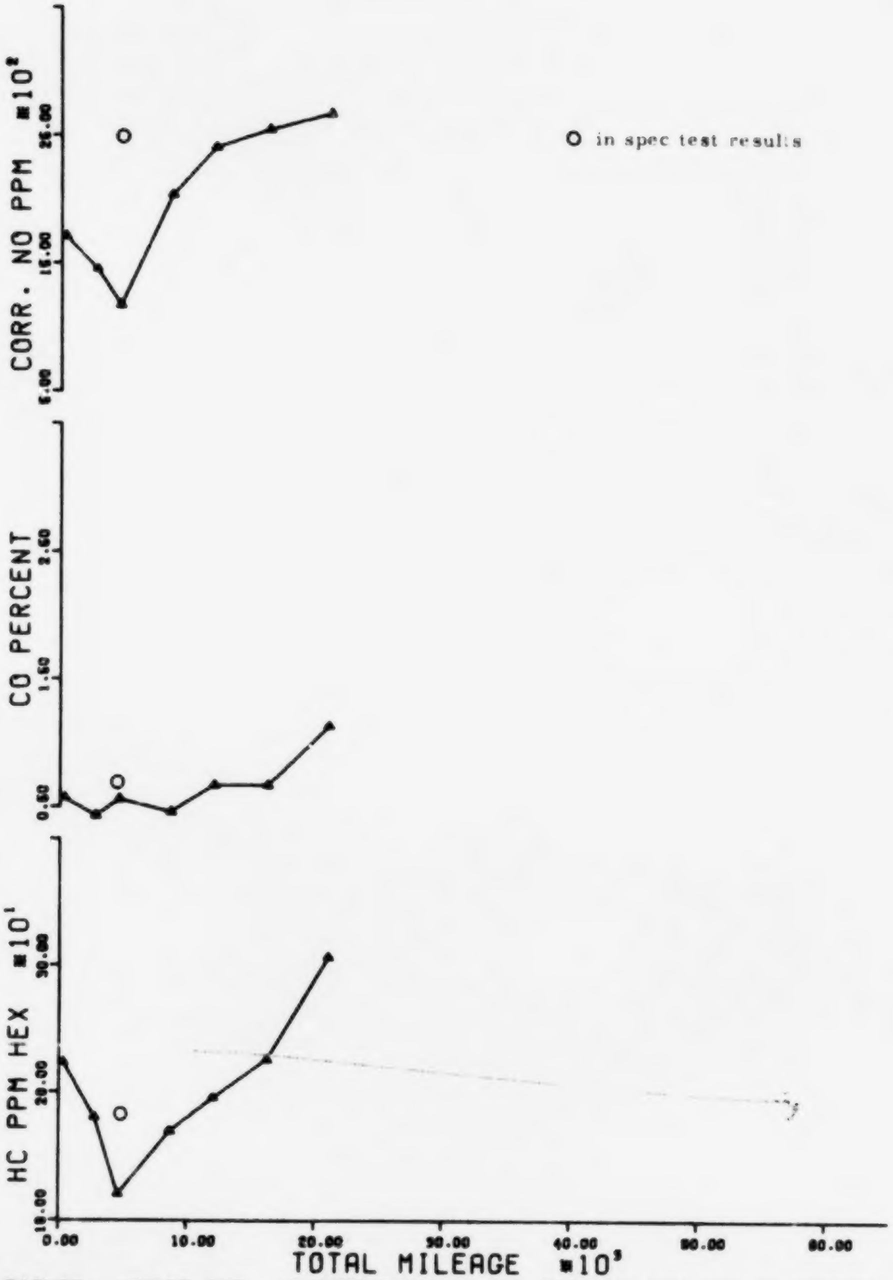

FIGURE E-27UNIT 027 70 FORD10000 LB GVW SERVICE 300 CID I6 ENGINE

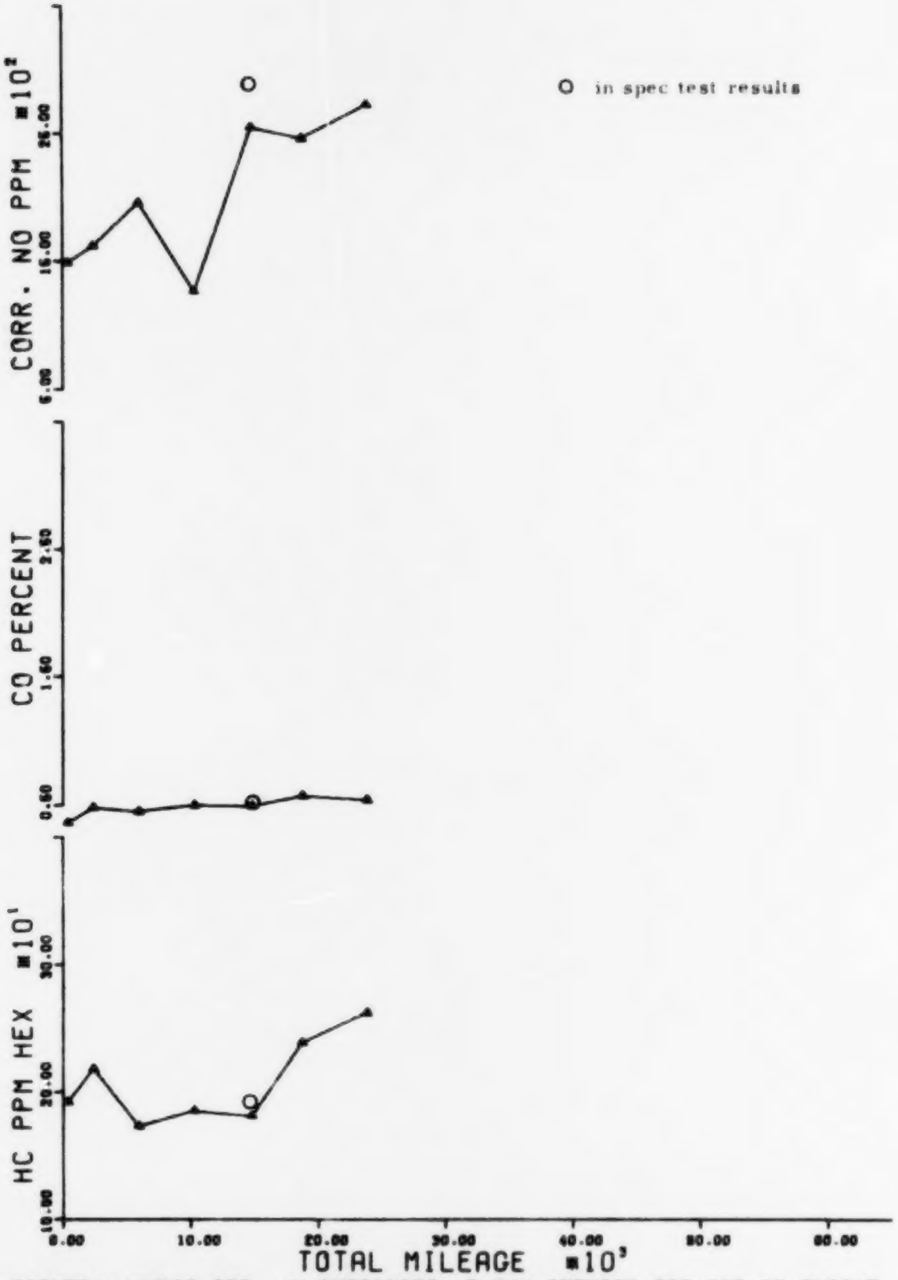

FIGURE E-28UNIT 028 70 FORD10000 LB GVW SERVICE 300 CID I6 ENGINE

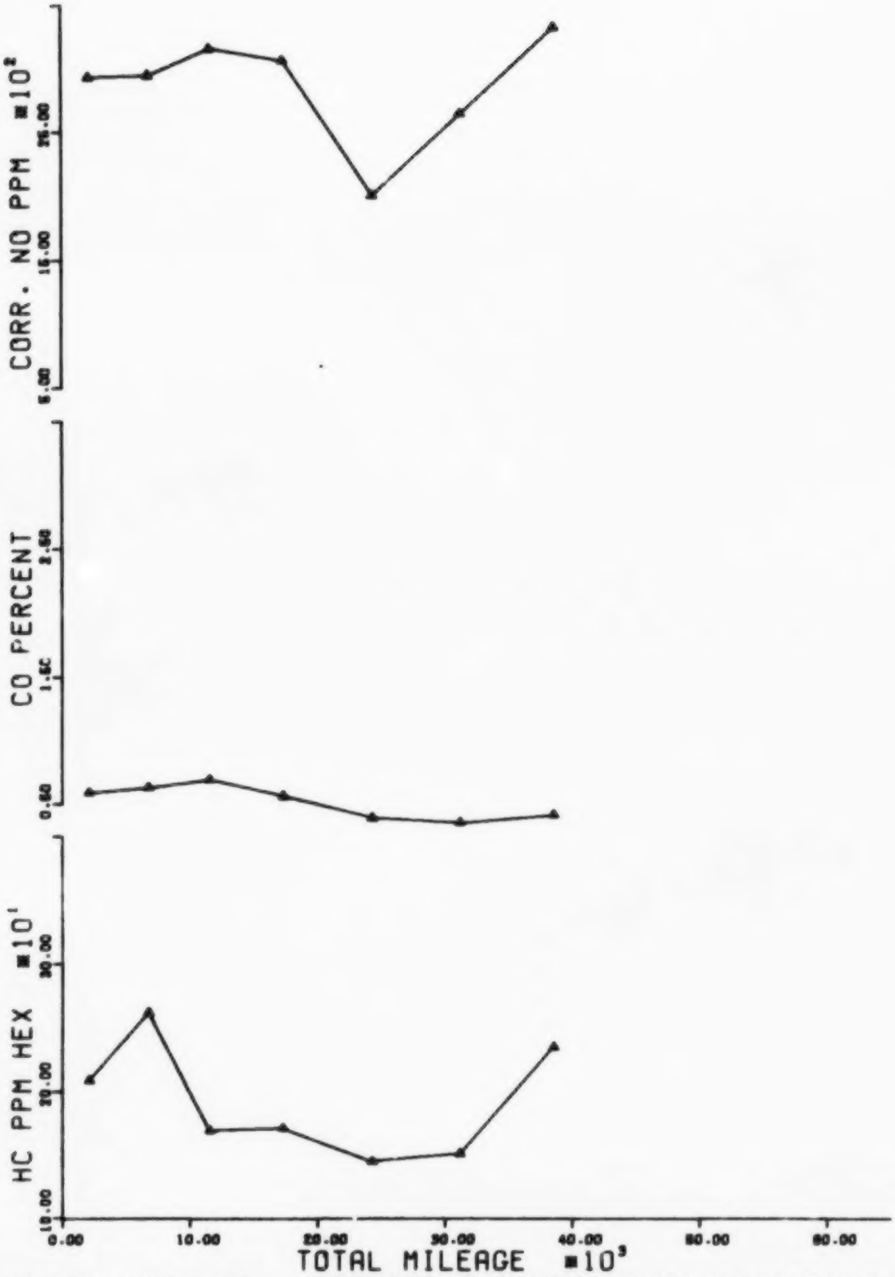

FIGURE E-29UNIT 029 70 FORD16000 LB GVW SERVICE 300 CID I6 ENGINE

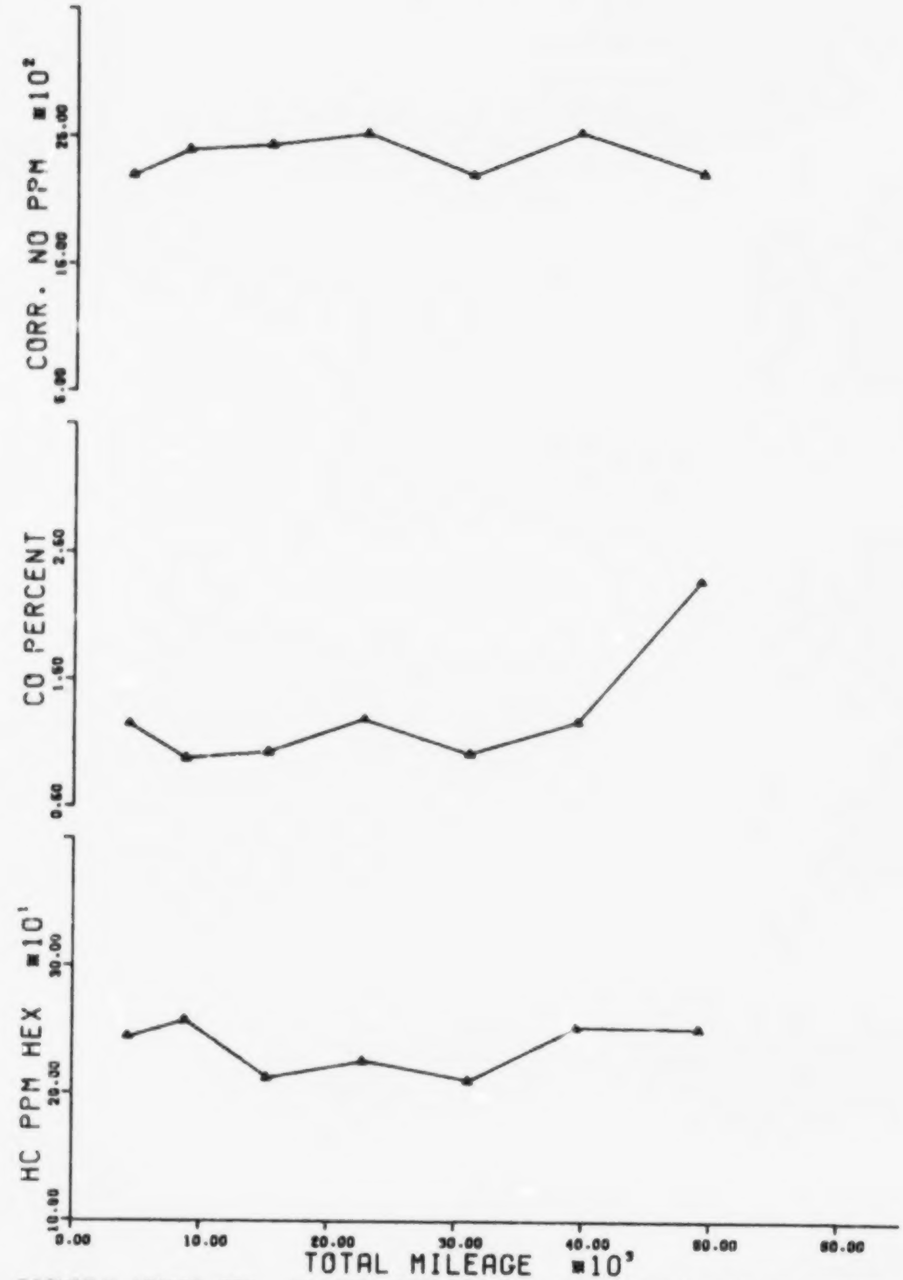

FIGURE E-30 UNIT 030 70 CHEV 9000 LB GVW SERVICE 292 CID I6 ENGINE

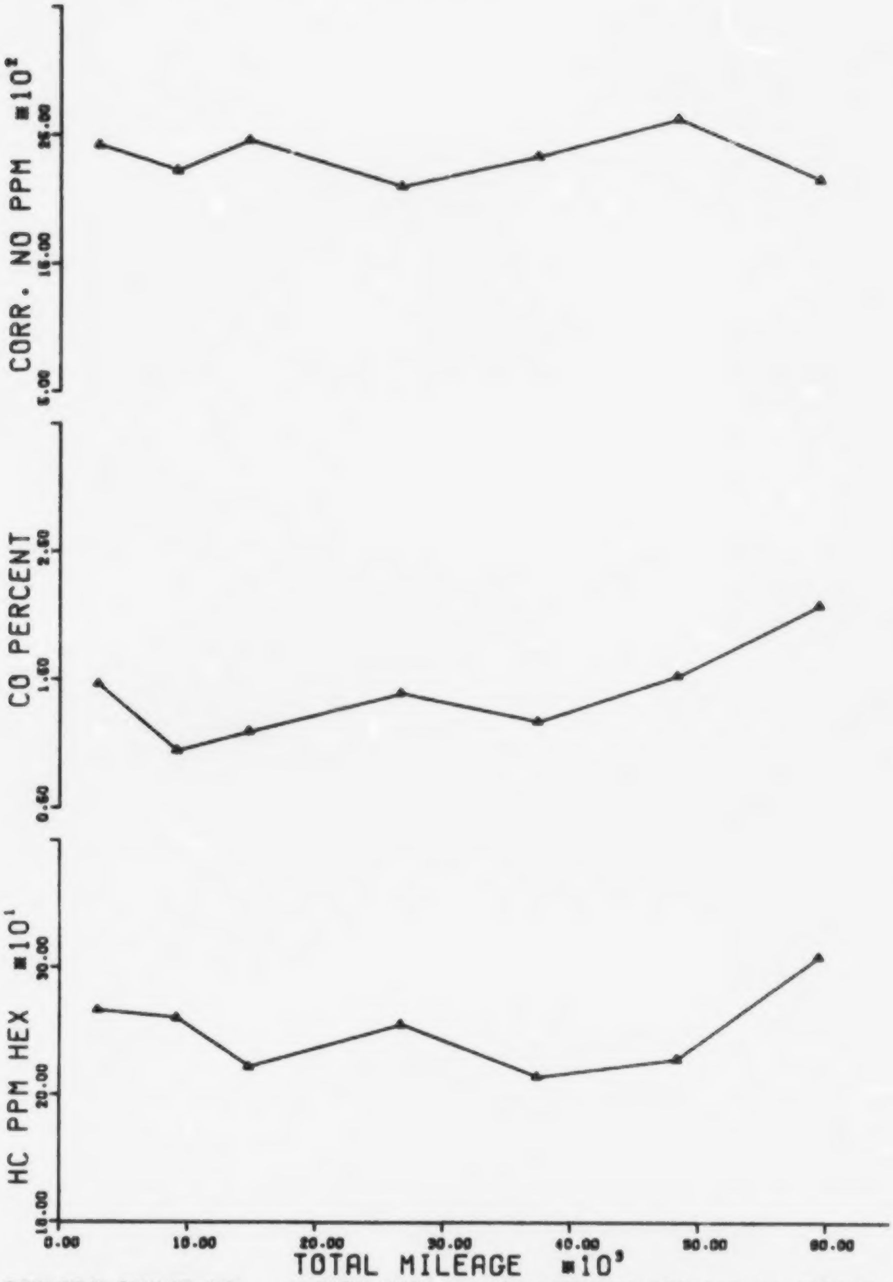

FIGURE E-31 UNIT 031 70 CHEV 7500 LB GVW SERVICE 250 CID I6 ENGINE

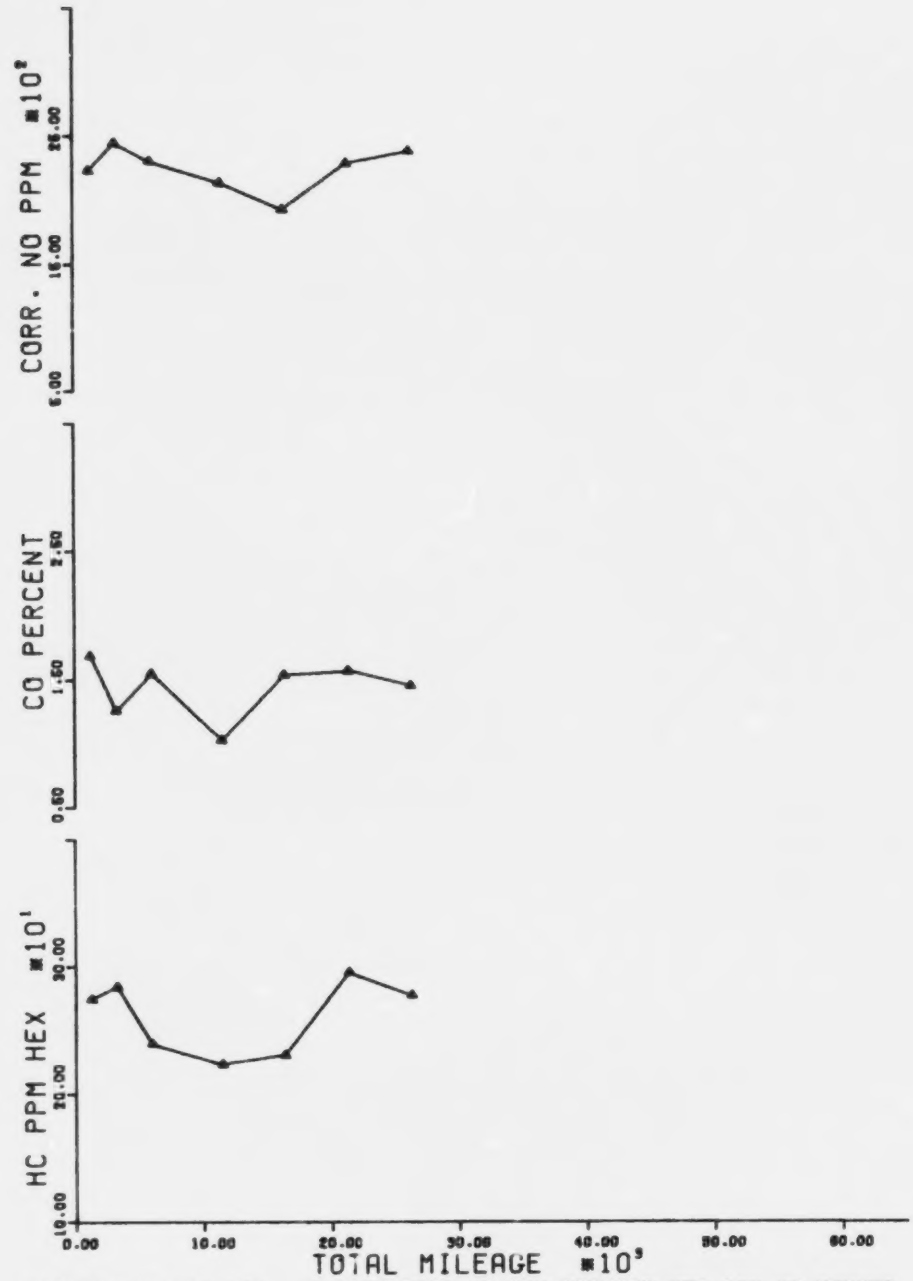

FIGURE E-32 UNIT 032 70 CHEV 7500 LB GVW SERVICE 250 CID I6 ENGINE

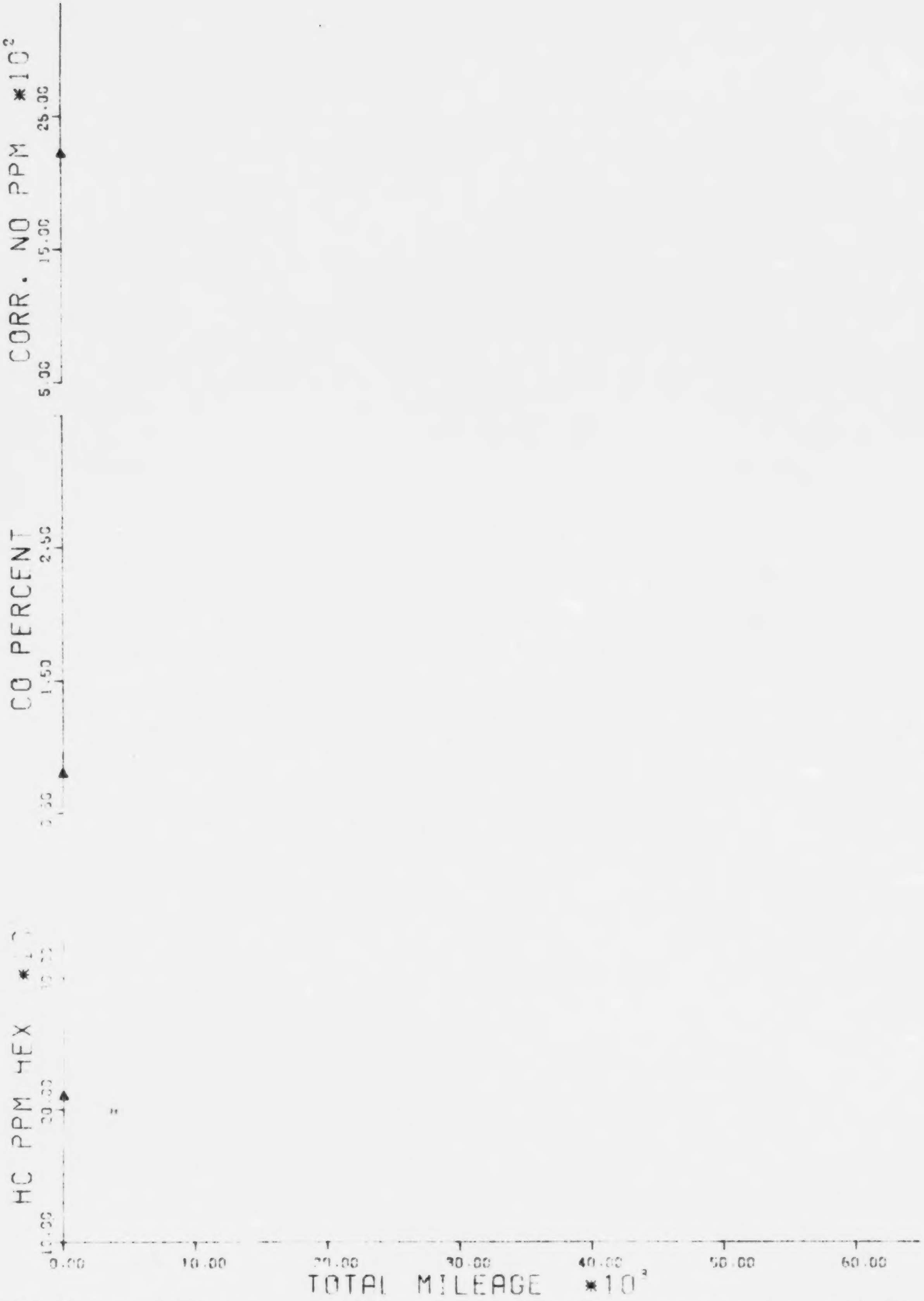

FIGURE E-33 UNIT 033 **71** FORD 24000 GVW VAN 300 CID I6 ENGINE

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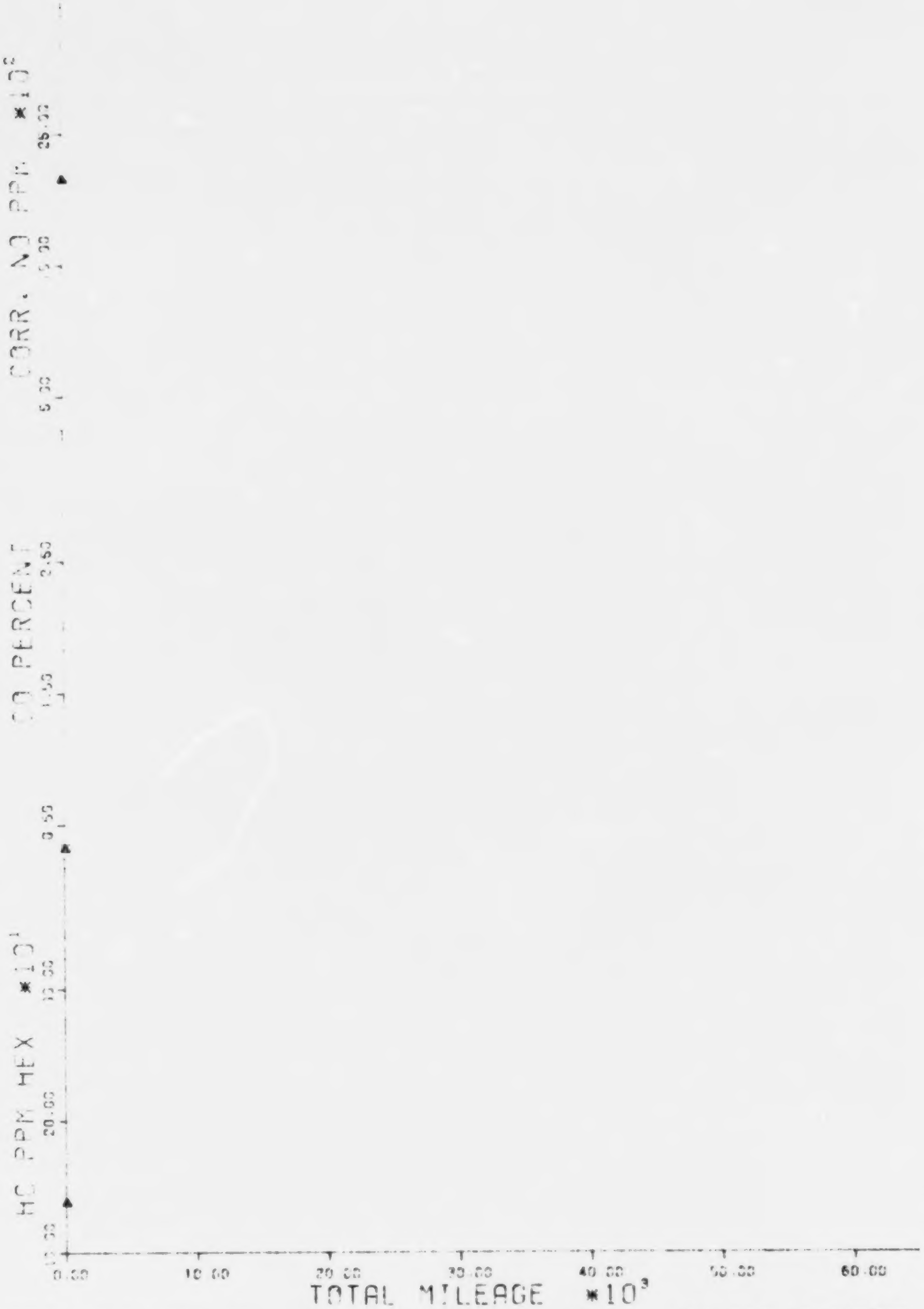


FIGURE E-34.UNIT 034 71 FORD 24000 GVW VAN 300 CID I6 ENGINE

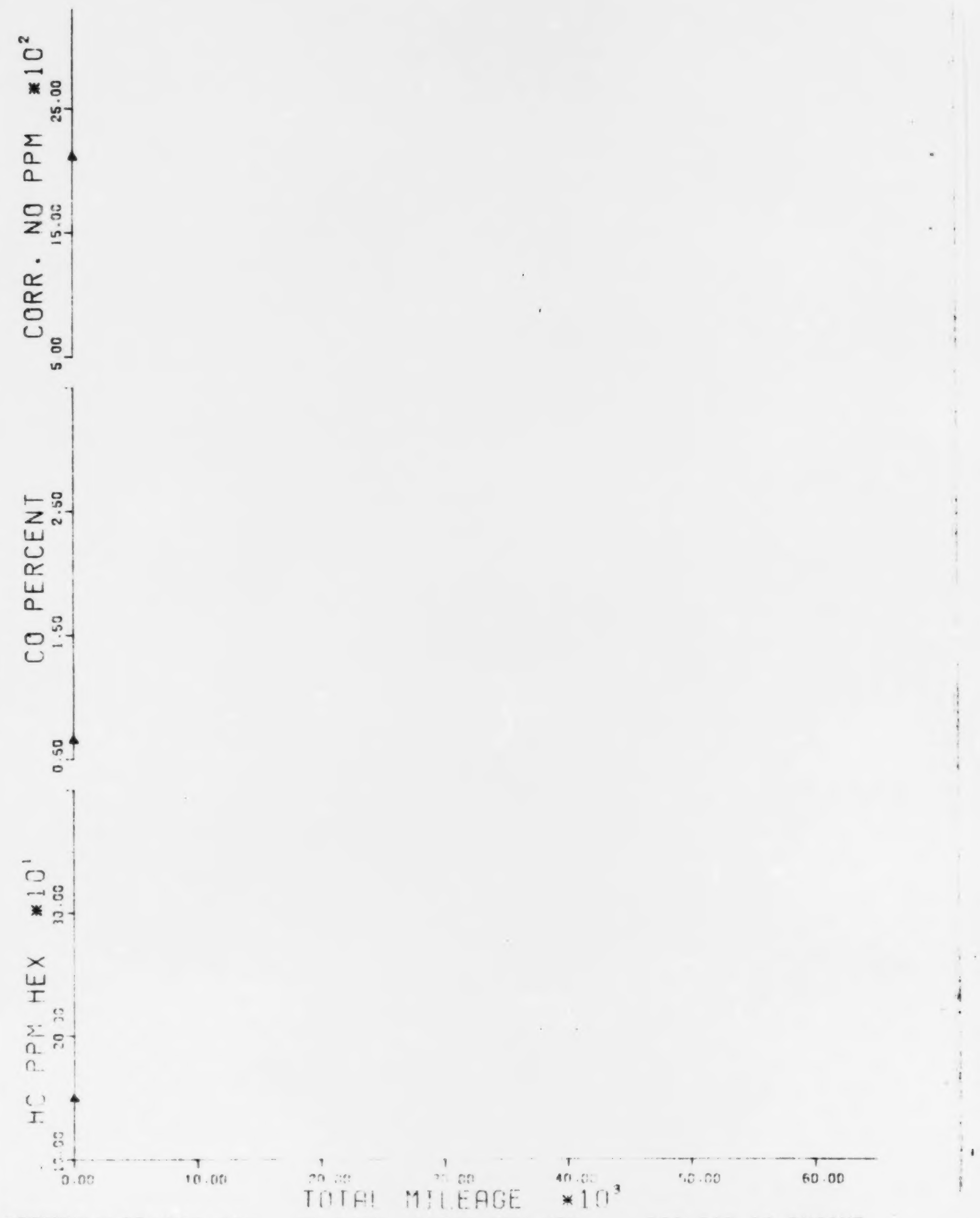


FIGURE E-35. UNIT 035 71 FORD 24000 GVW VAN 300 CID I6 ENGINE

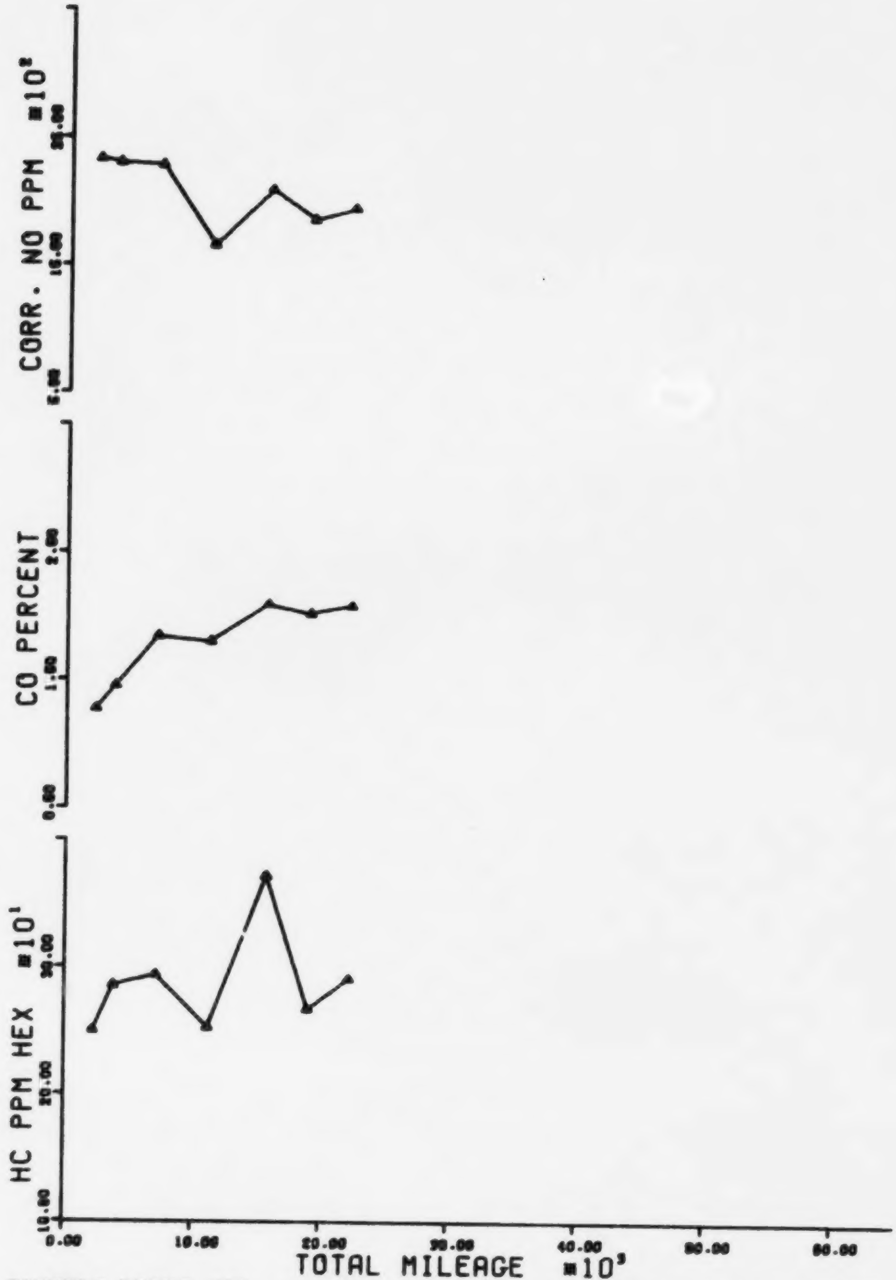


FIGURE E-36 UNIT 036 70 CHEV 7500 LB GVW SERVICE 250 CID I6 ENGINE

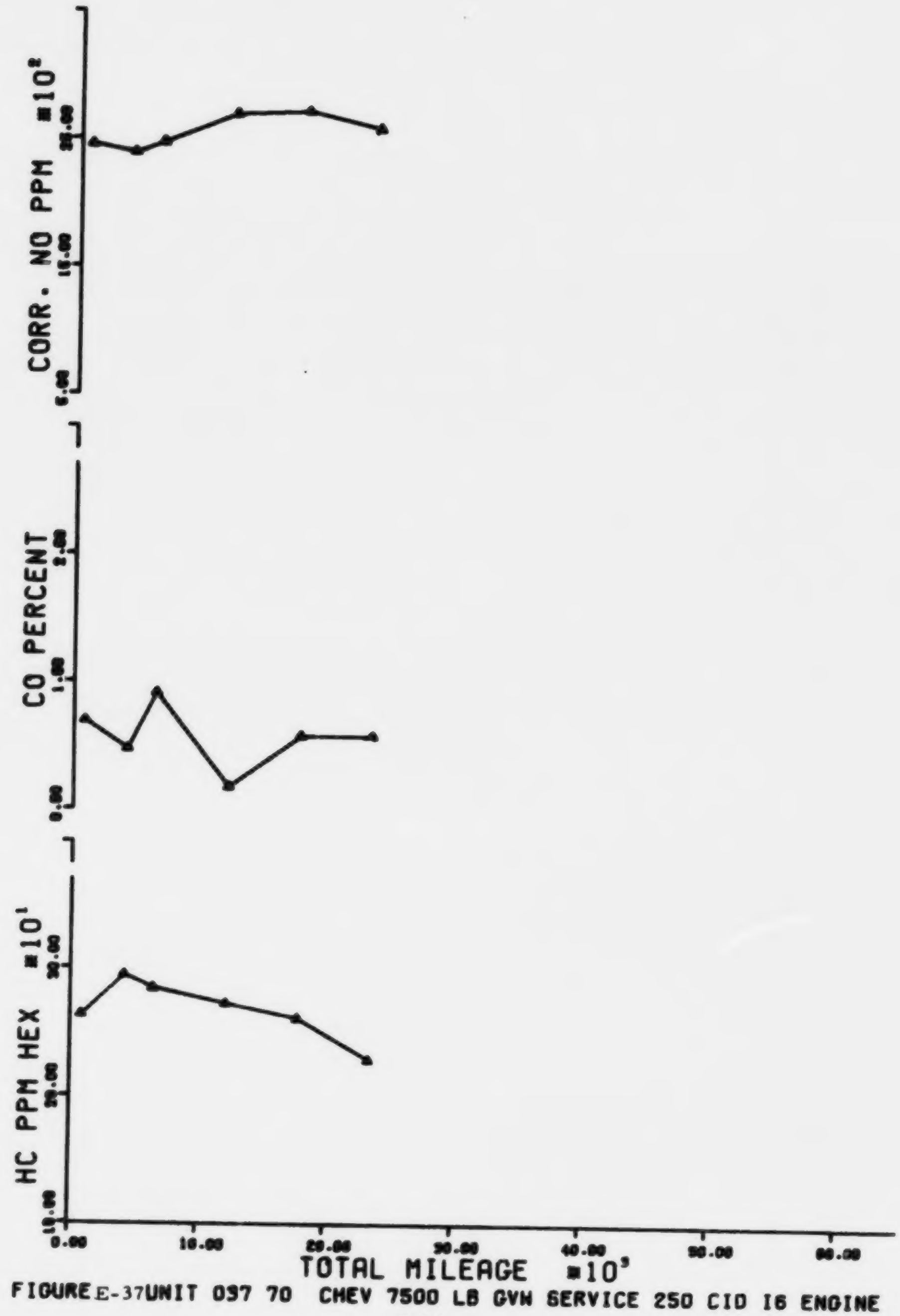
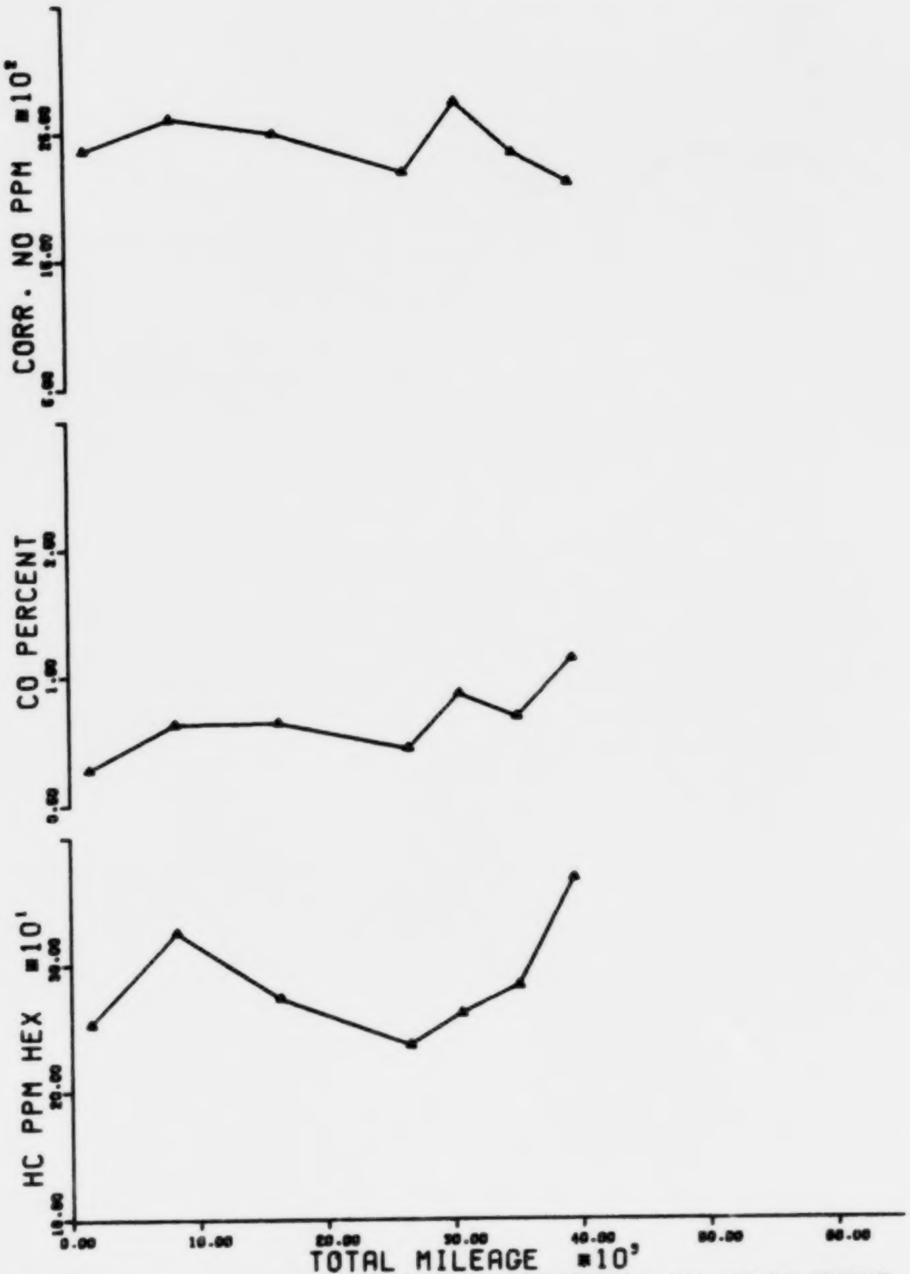


FIGURE E-37 UNIT 037 70 CHEV 7500 LB GVW SERVICE 250 CID I6 ENGINE



FIGUREE-38UNIT 038 70   IHC14000 LB GVW SERVICE 304 CID V8 ENGINE

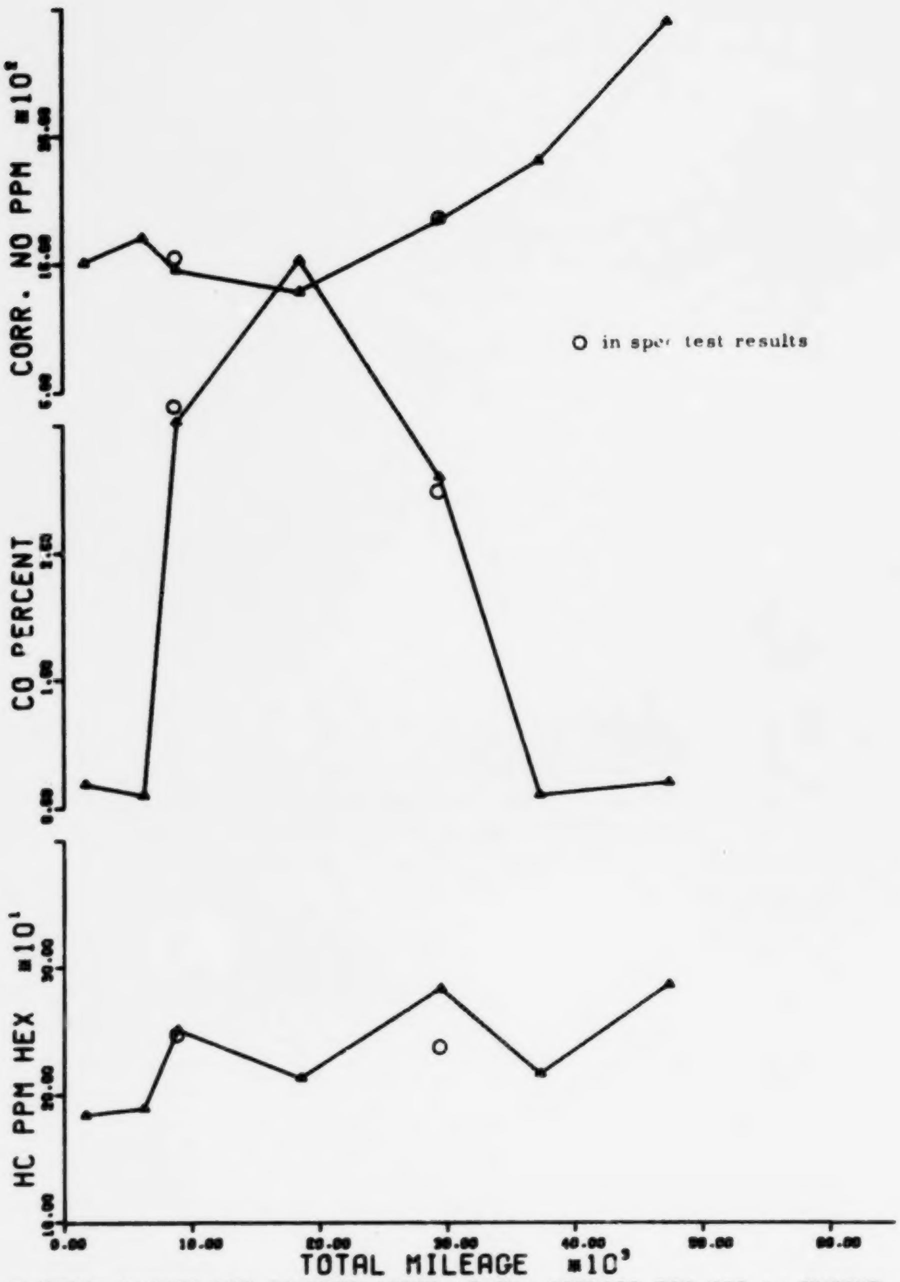
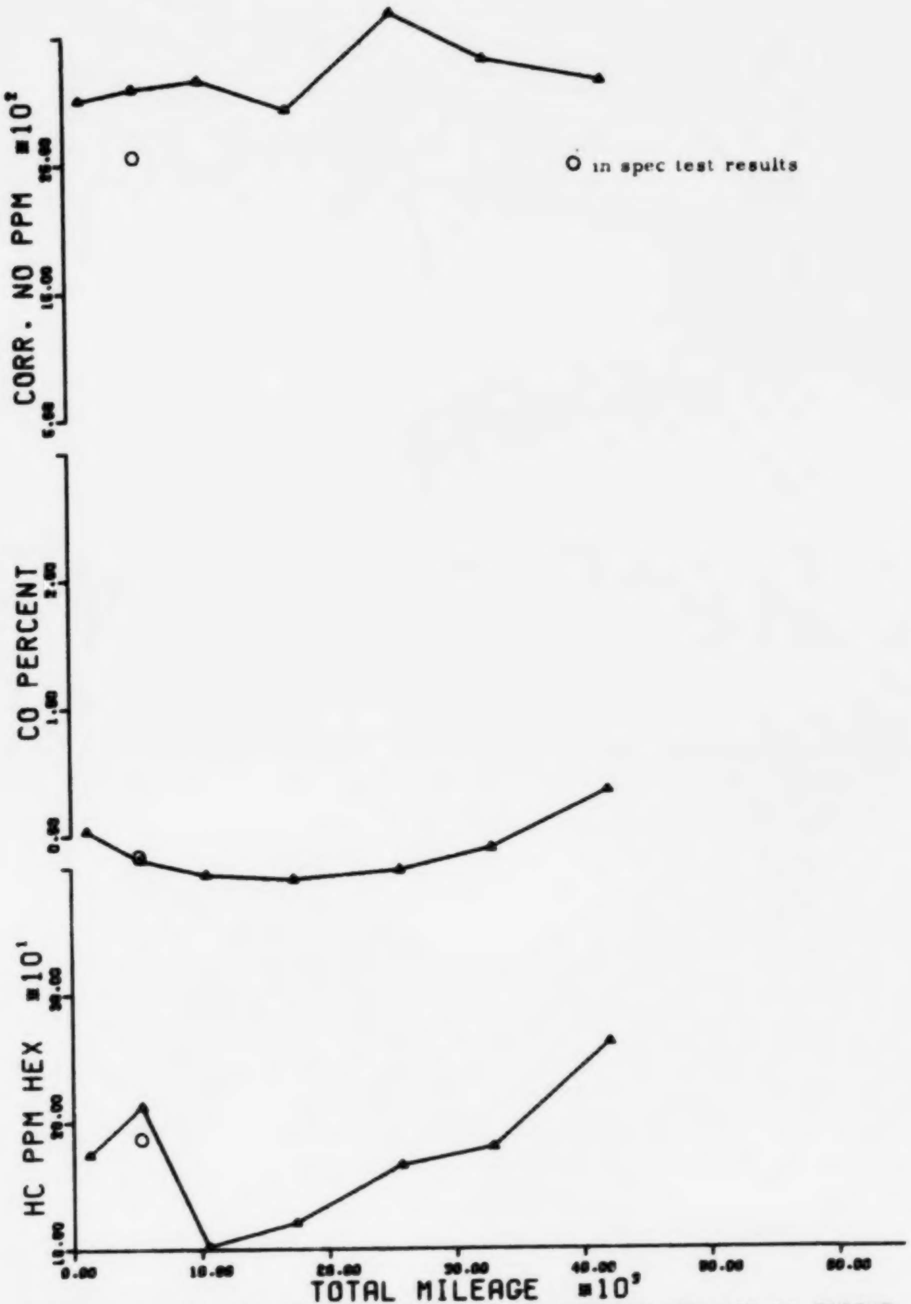


FIGURE E-39 UNIT 039 70 FORD 16000 LB GVW SERVICE 300 CID I6 ENGINE



FIGUREE-40UNIT 040 70 FORD 16000 LB GVW SERVICE 300 CID I6 ENGINE

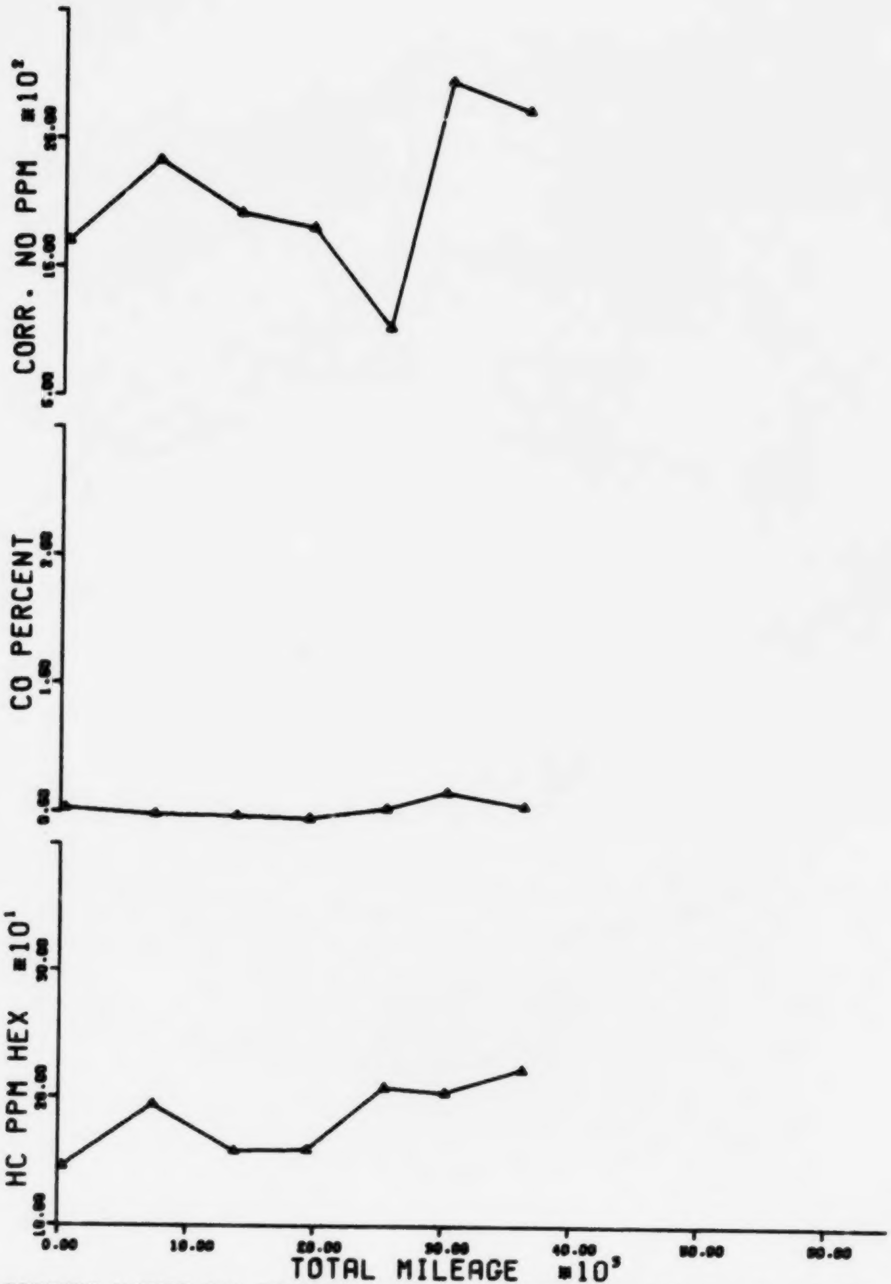
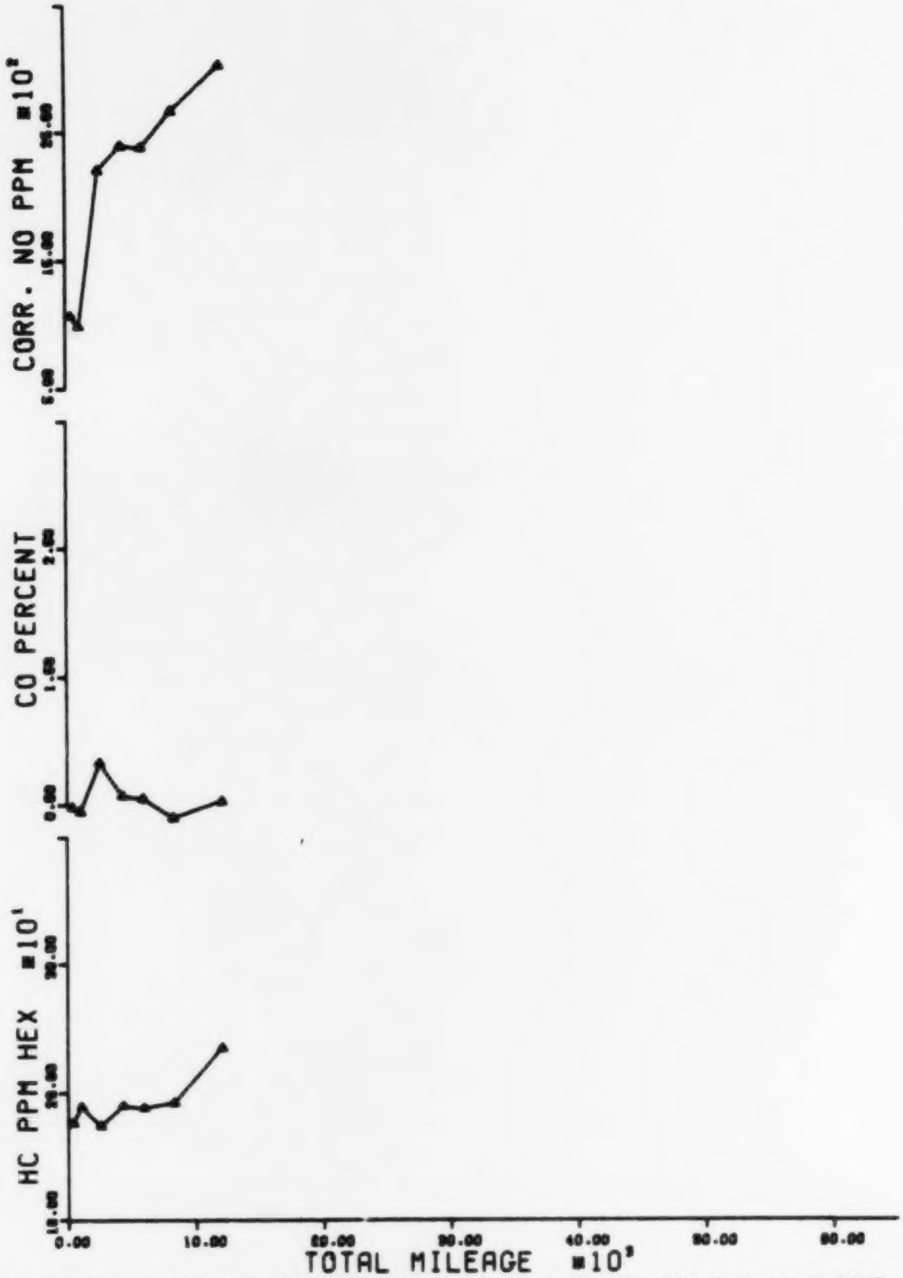
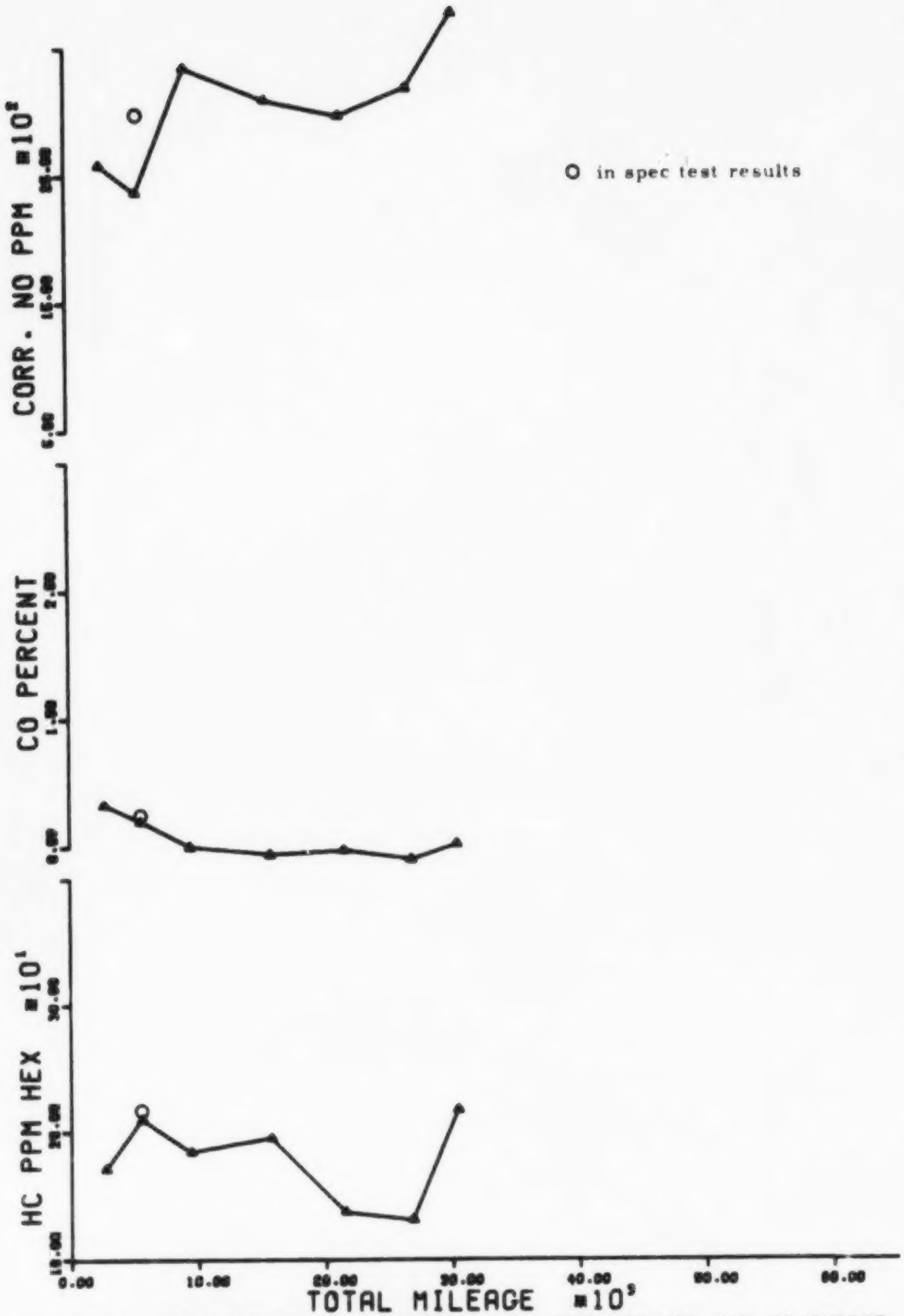


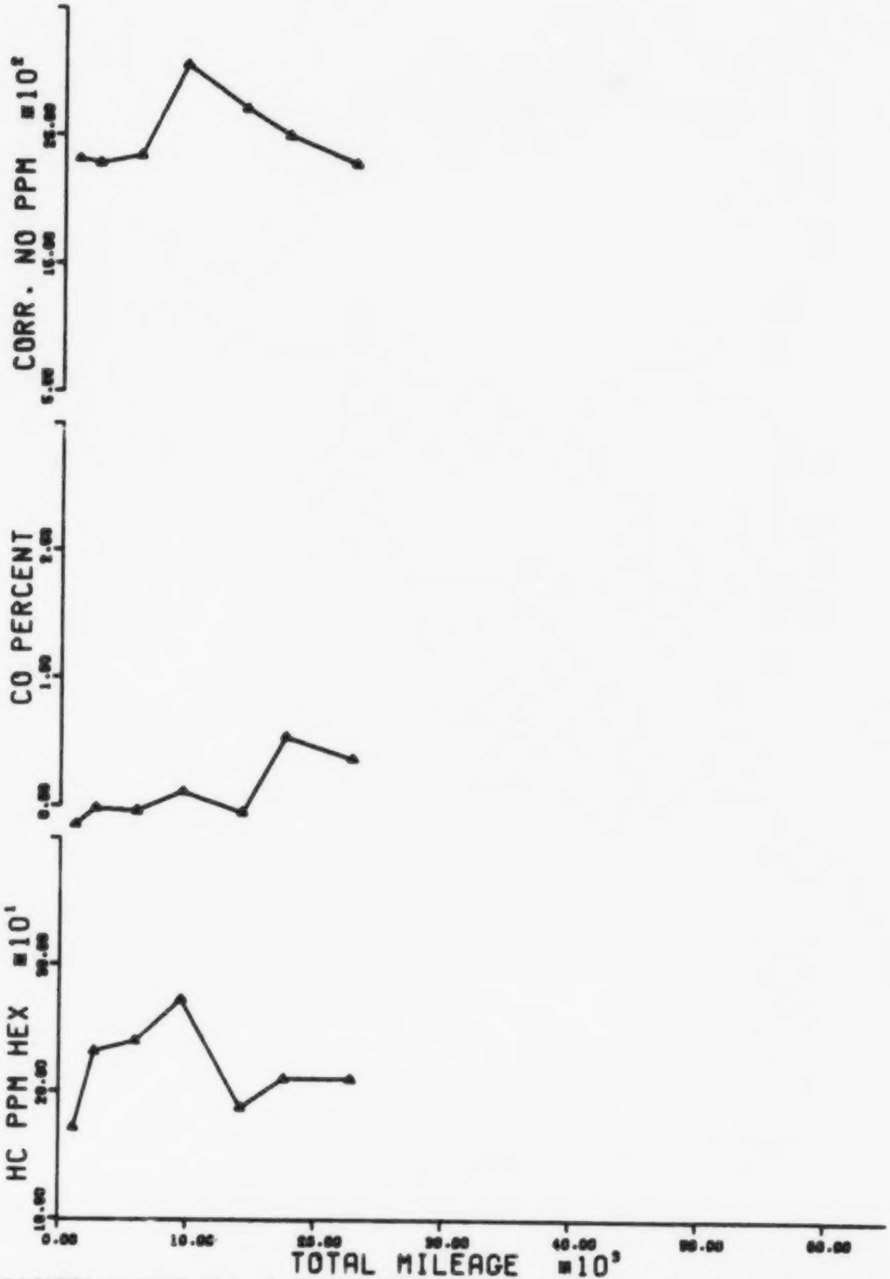
FIGURE E-41. UNIT 041 70 FORD 16000 LB GVW SERVICE 300 CID I6 ENGINE



FIGUREE-42UNIT 042 70 FORD 10000 LB GVW WRECKER 300 CID I6 ENGINE



FIGUREE-43UNIT 043 70 FORD 16000 LB GVW SERVICE 300 CID I6 ENGINE



FIGUREE-44.UNIT 044 70 FORD 10000 LB GVW STAKE 300 CID I6 ENGINE

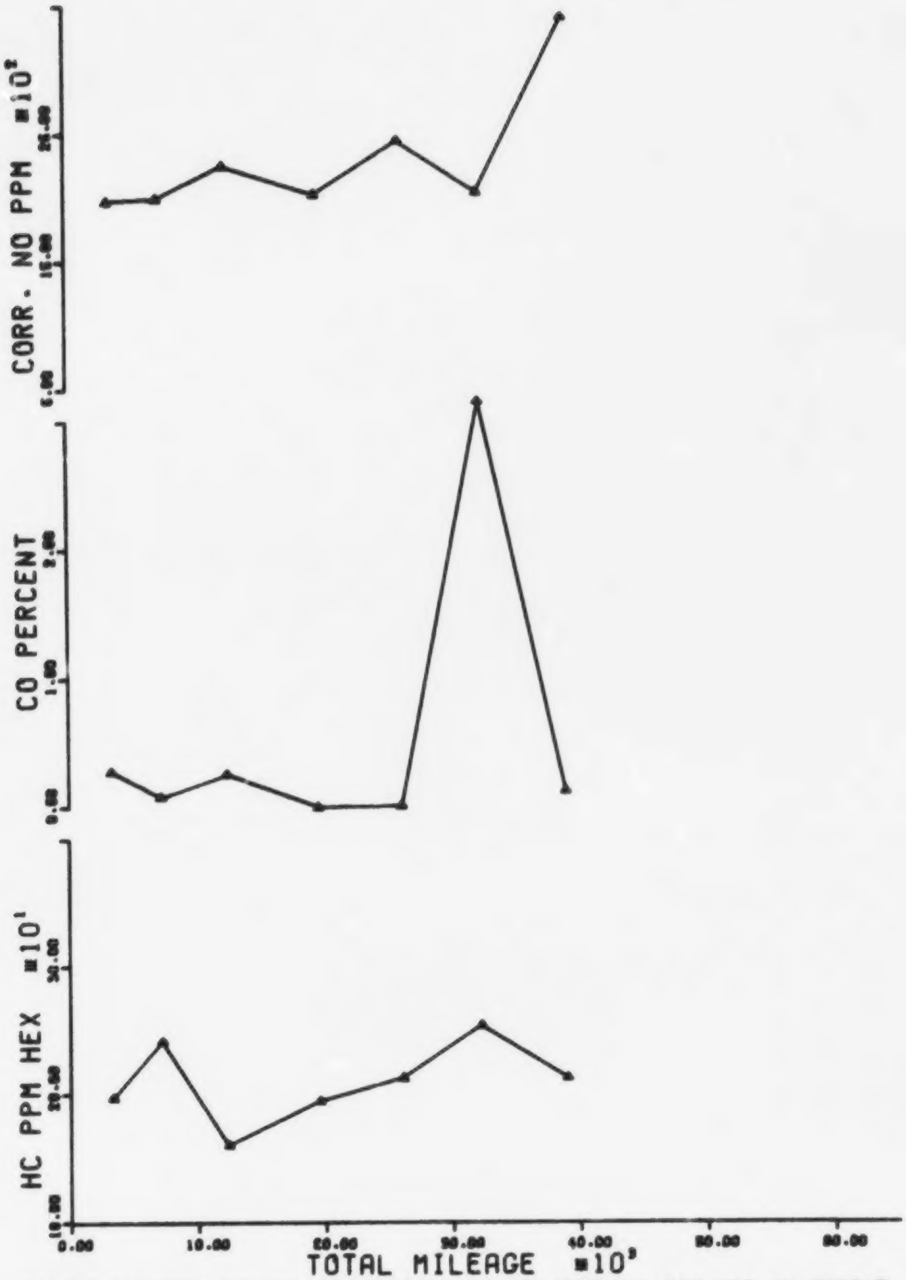


FIGURE E-45 UNIT 045 70 FORD 16000 LB GVW SERVICE 300 CID I6 ENGINE

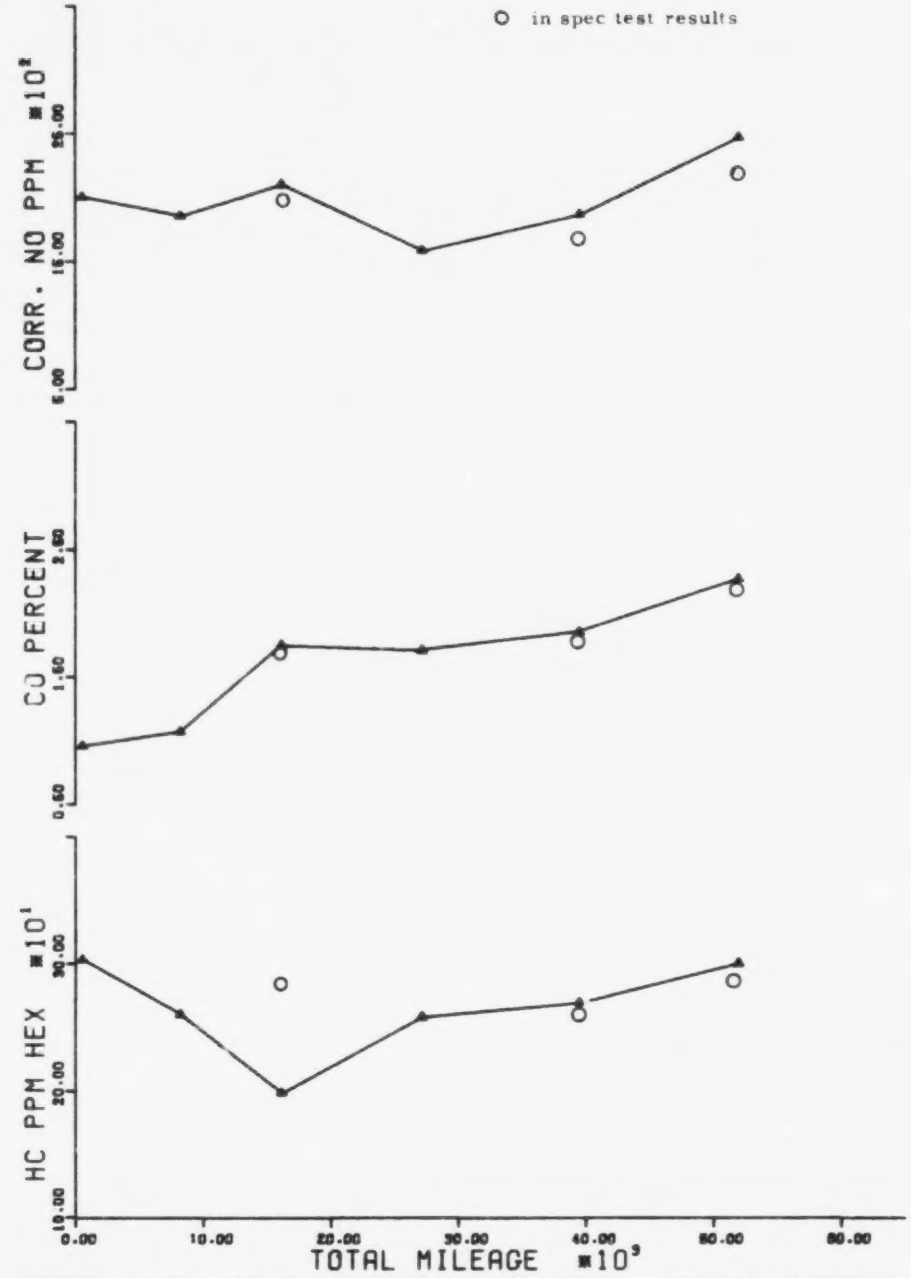


FIGURE E-46 UNIT 046 70 IHC 19700 LB GVW TRUCK 304 CID V8 ENGINE

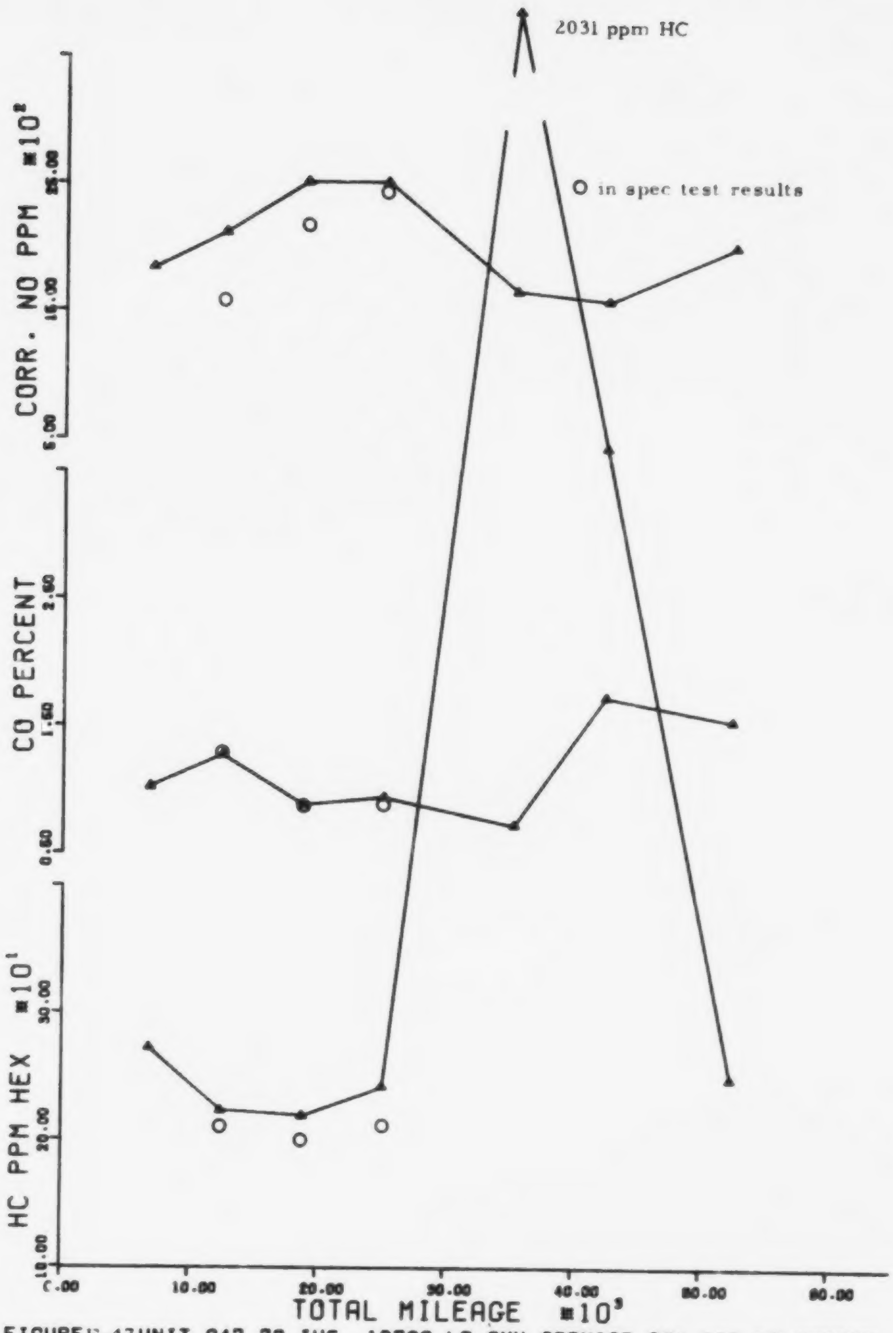
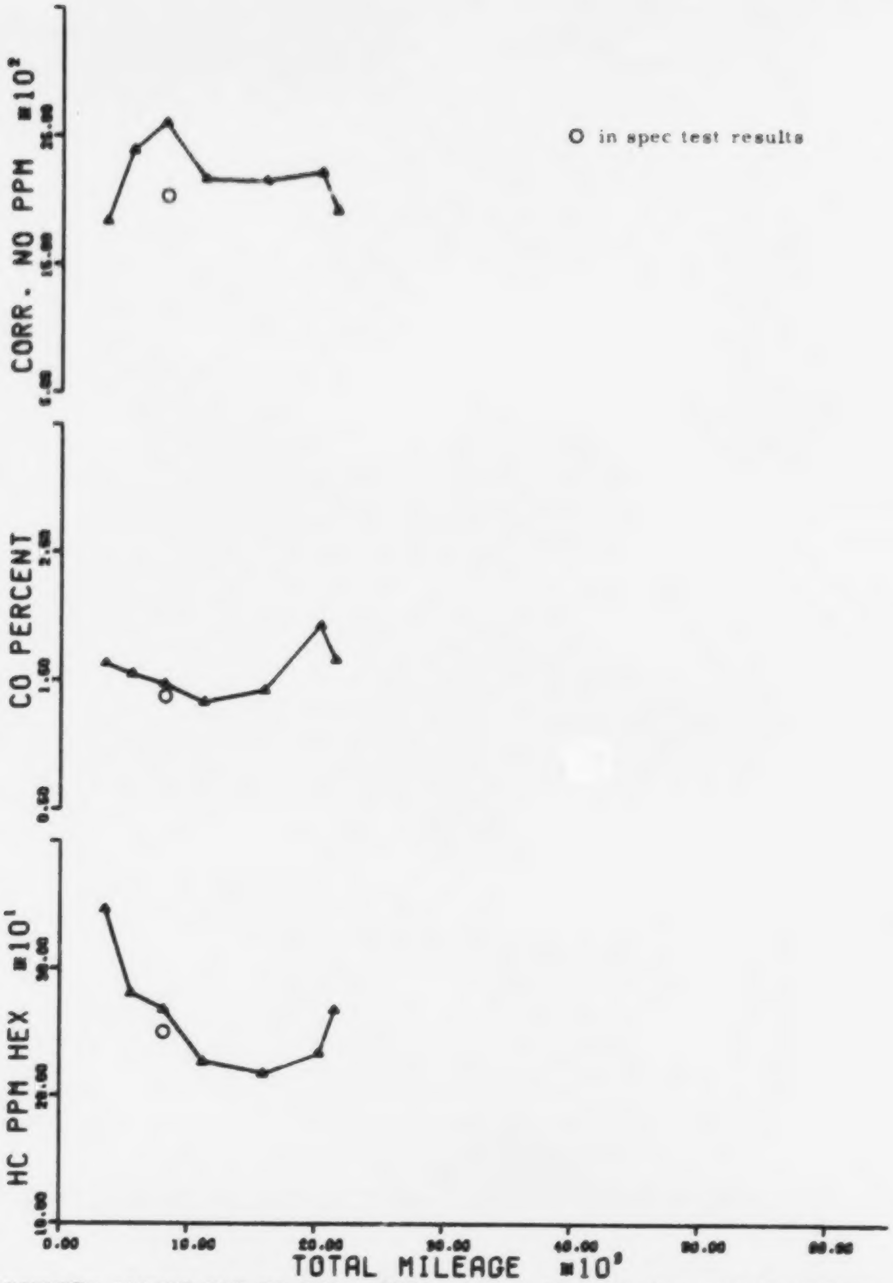
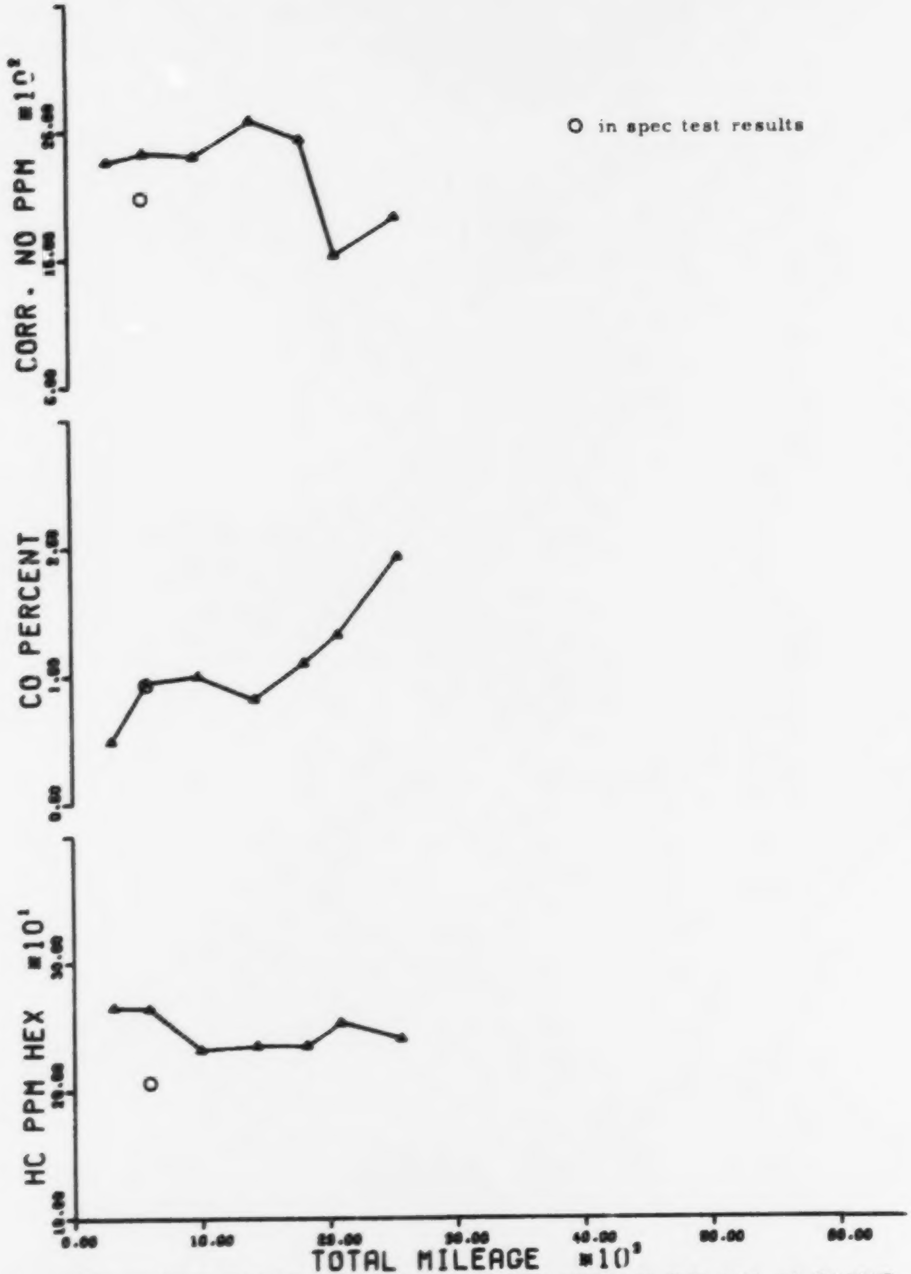


FIGURE E-47 UNIT 047 70 IHC 19700 LB GVW SERVICE 304 CID V8 ENGINE



FIGUREE-48UNIT 048 70 IHC 19700 LB GVW SERVICE 304 CID V8 ENGINE



FIGUREE-49UNIT 049 70 IHC 10000 LB GVW CREW TR 304 CID V8 ENGINE

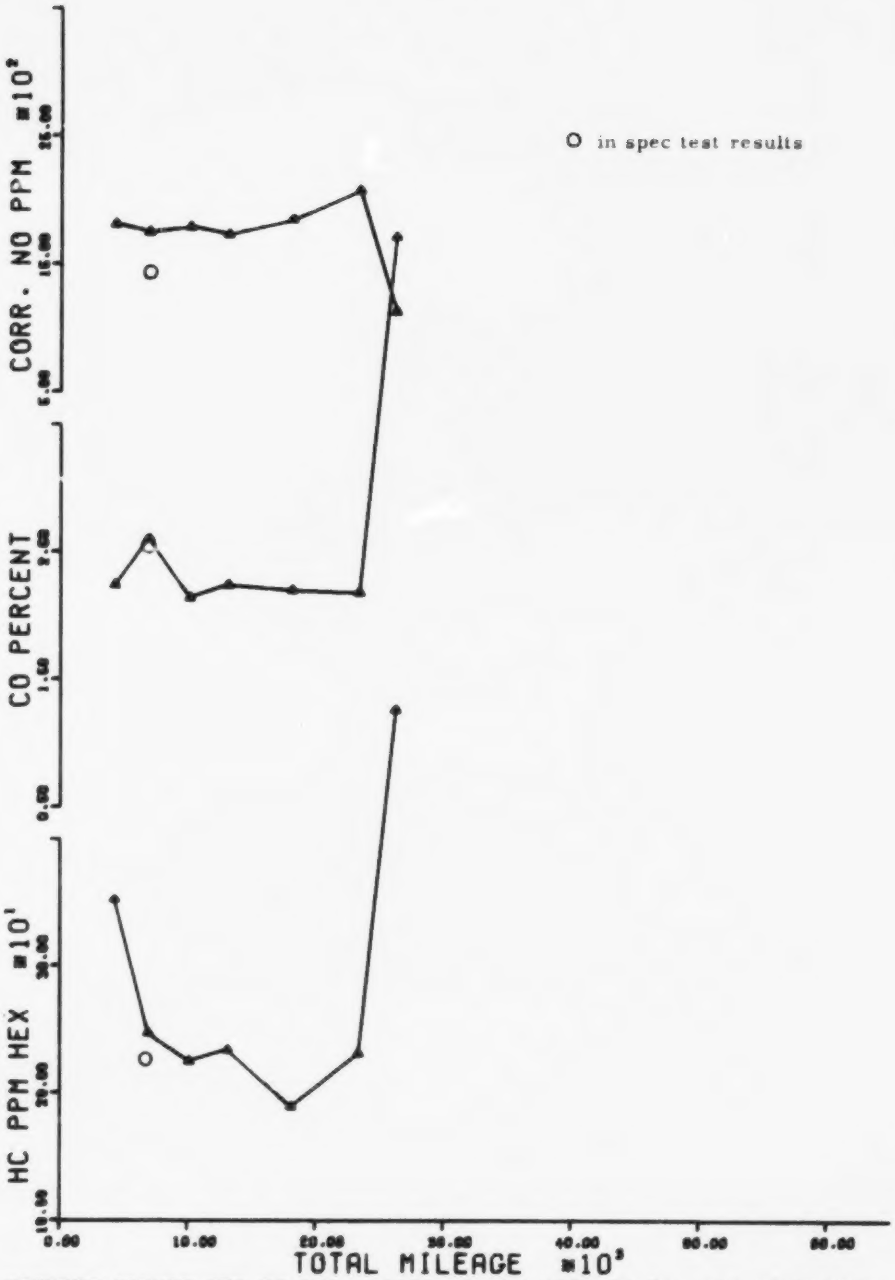


FIGURE E-50 UNIT 050 70 IHC 10000 LB GVW CREW TR 304 CID V8 ENGINE

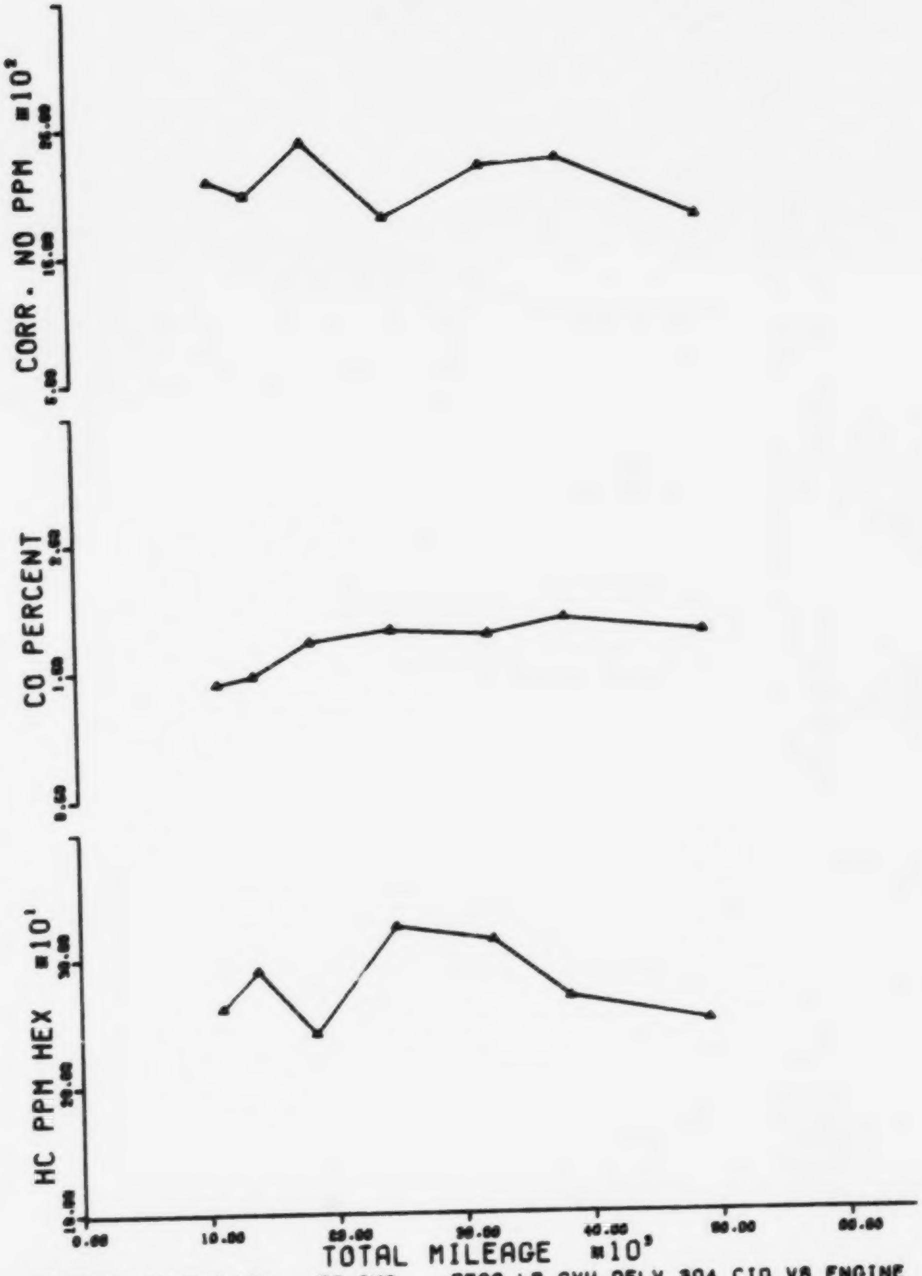


FIGURE E-51 UNIT 051 70 IHC 7500 LB GVW DELV 304 CID V8 ENGINE

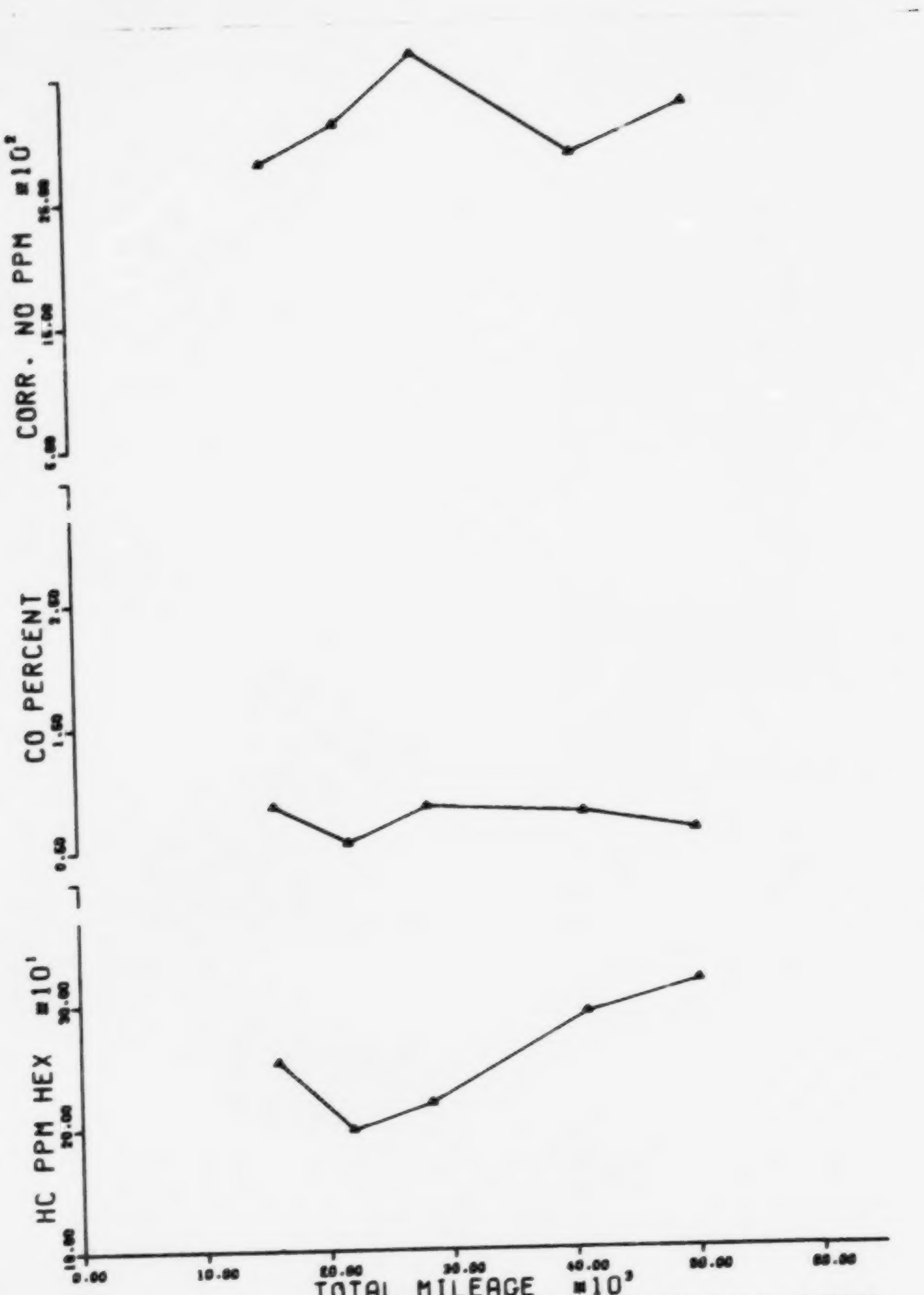


FIGURE E-52 UNIT 052   70 GMC   7500 LB GVW DELV 292 CID I6 ENGINE

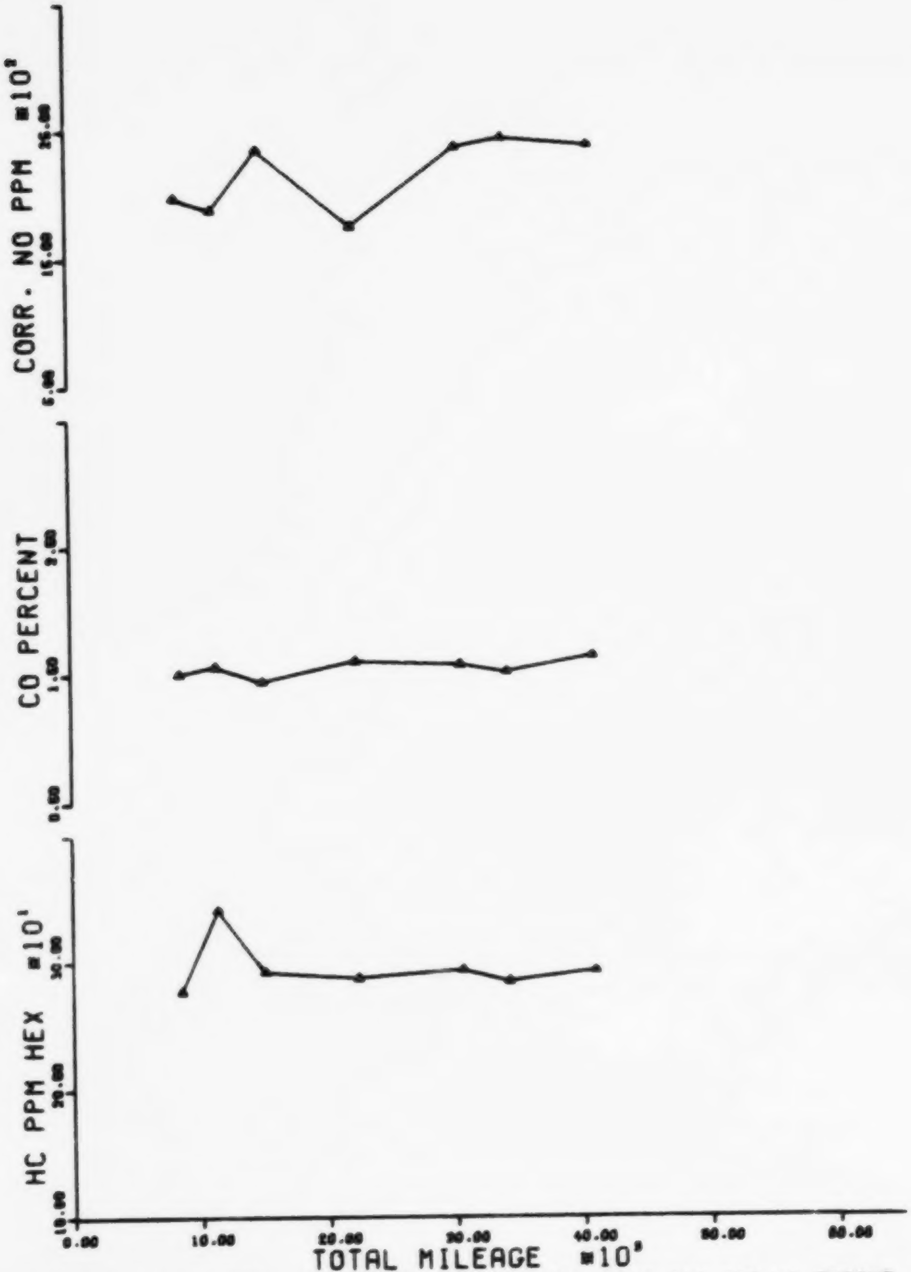
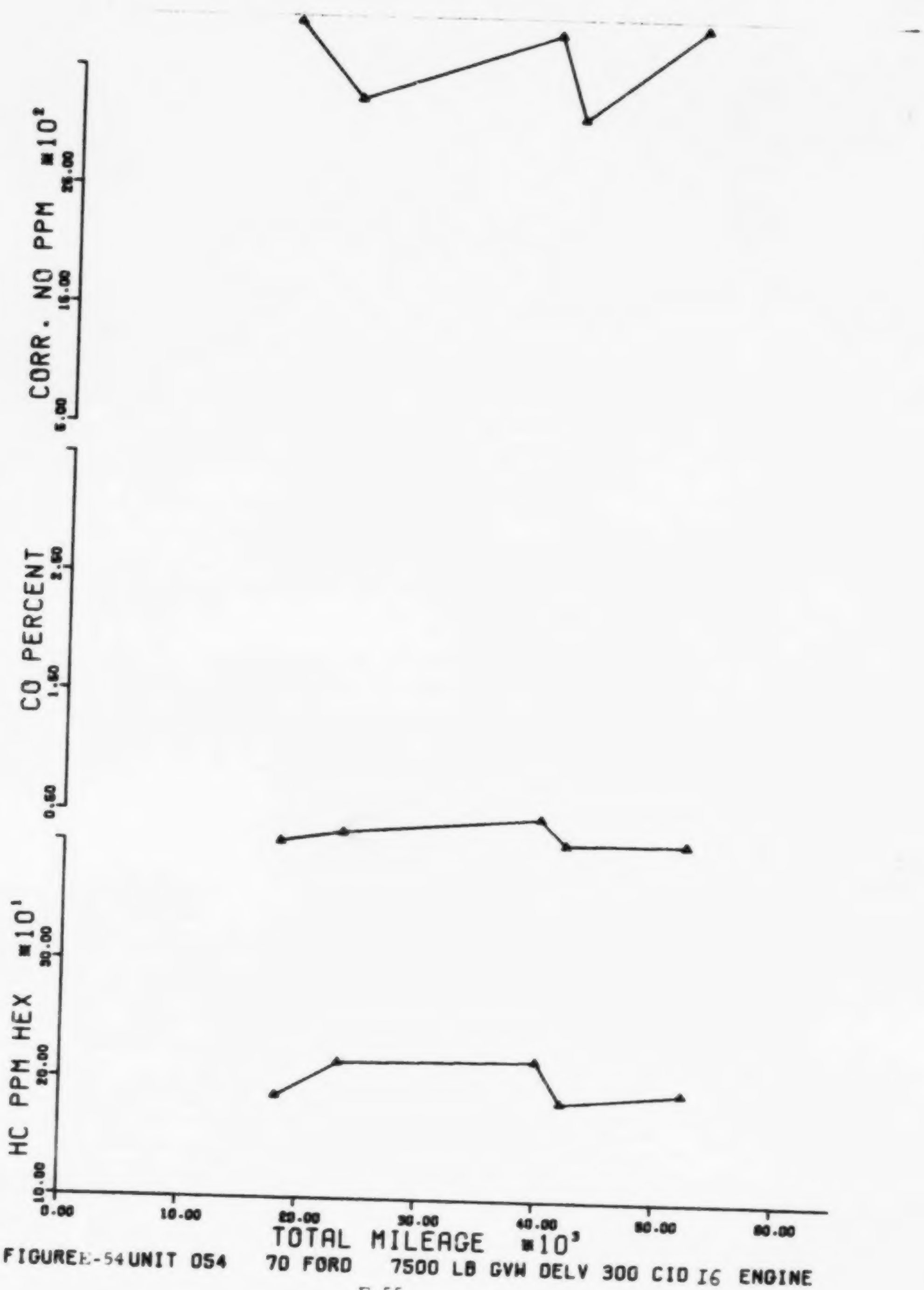


FIGURE E-53UNIT 053 70 DODGE 7500 LB GVW DELV 318 CID V8 ENGINE



FIGUREE-54UNIT 054 70 FORD 7500 LB GVW DELV 300 CID I6 ENGINE

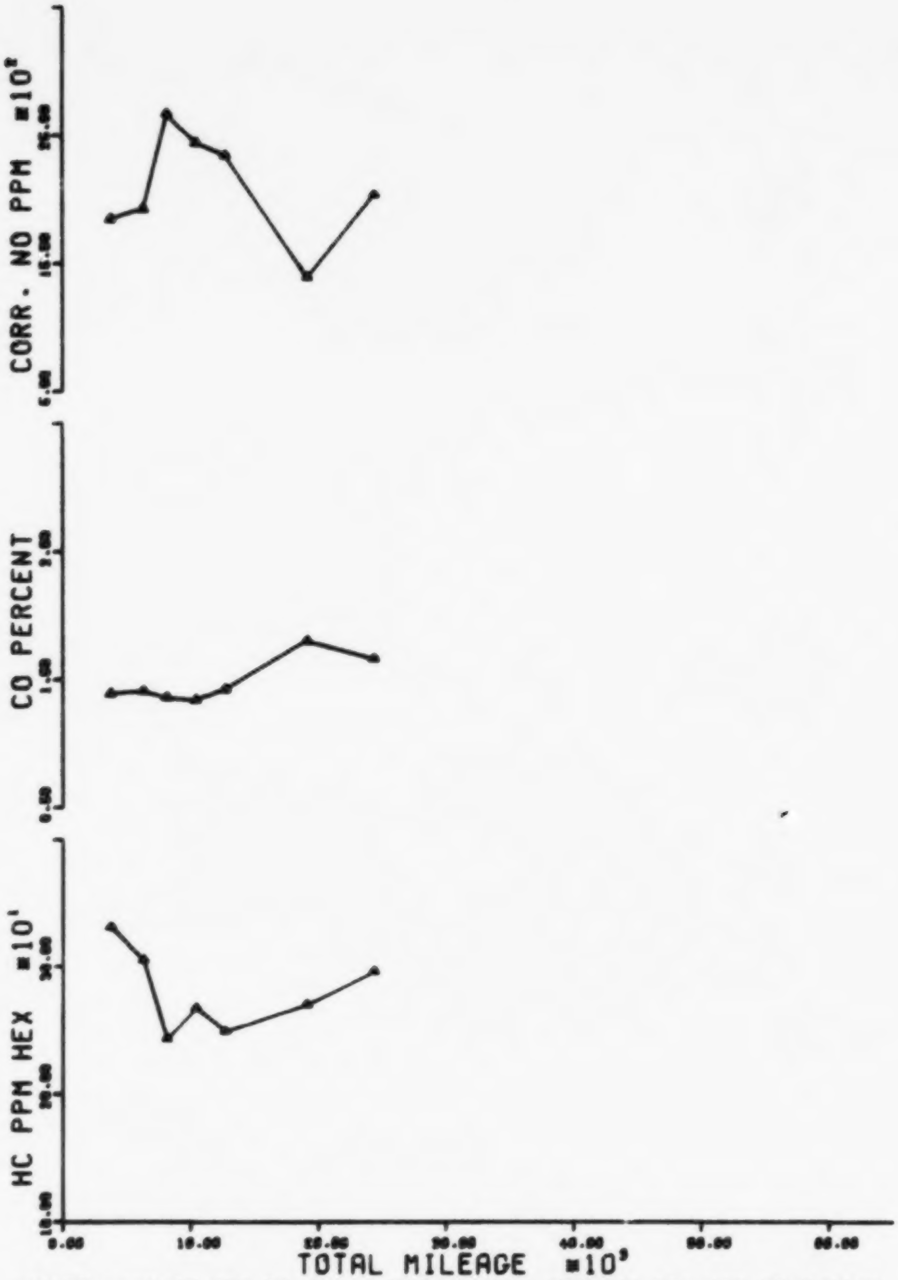


FIGURE E-55 UNIT 055 70 IHC 19700 LB GVW SERVICE 304 CID V8 ENGINE

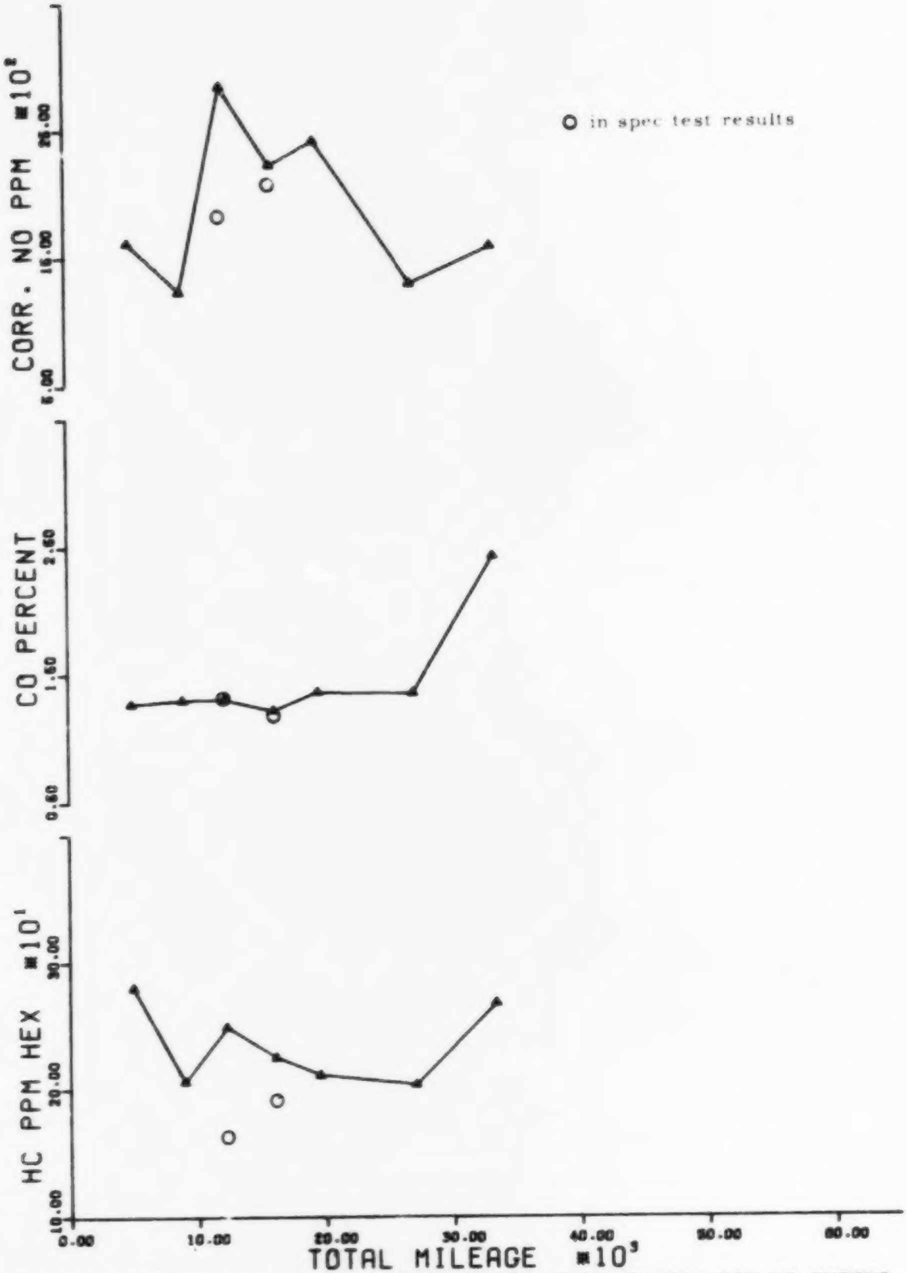
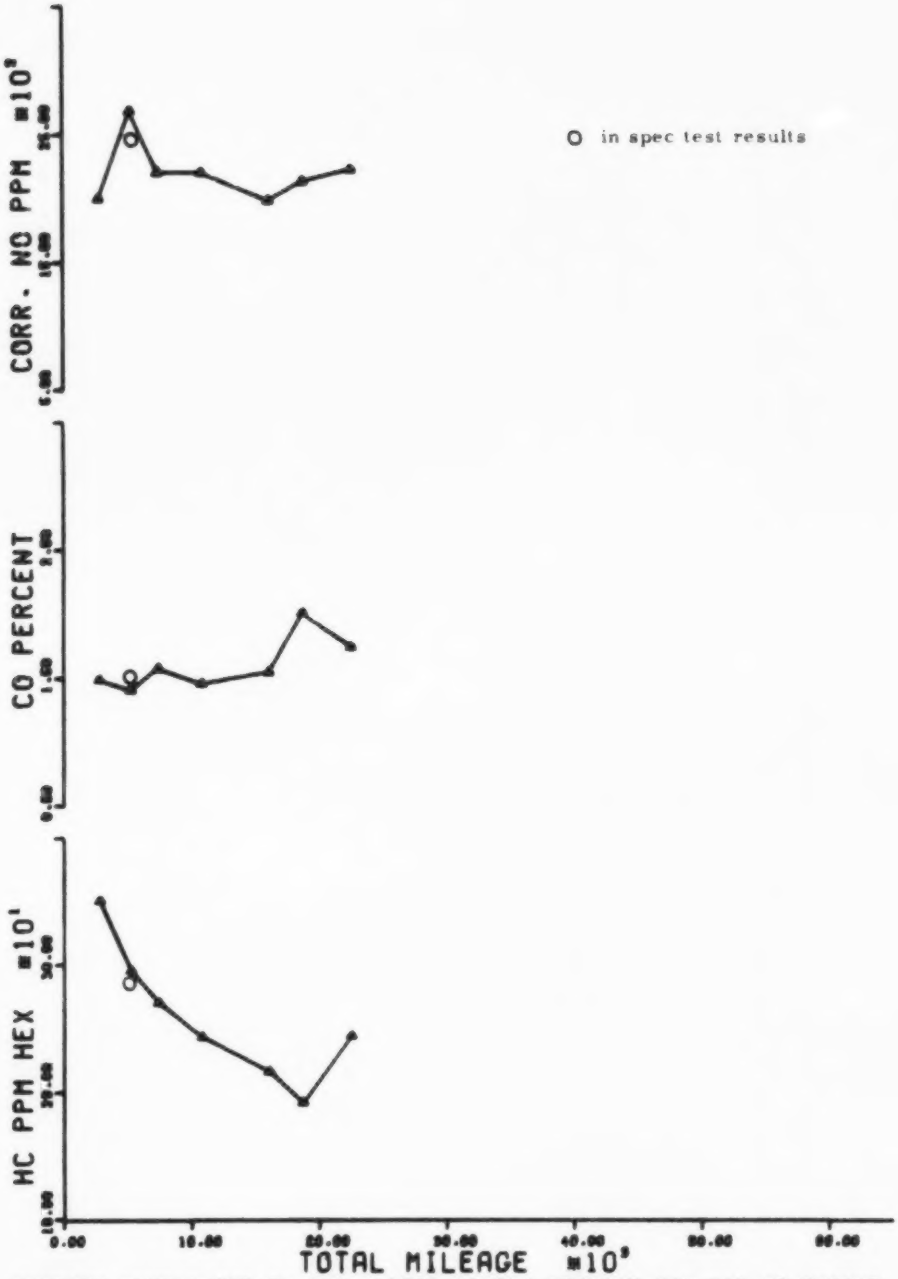


FIGURE E-56 UNIT 056 70 IHC 19700 LB GVW SERVICE 304 CID V8 ENGINE



FIGUREE-57UNIT 057 70 IHC 19700 LB GVW SERVICE 304 CID V8 ENGINE

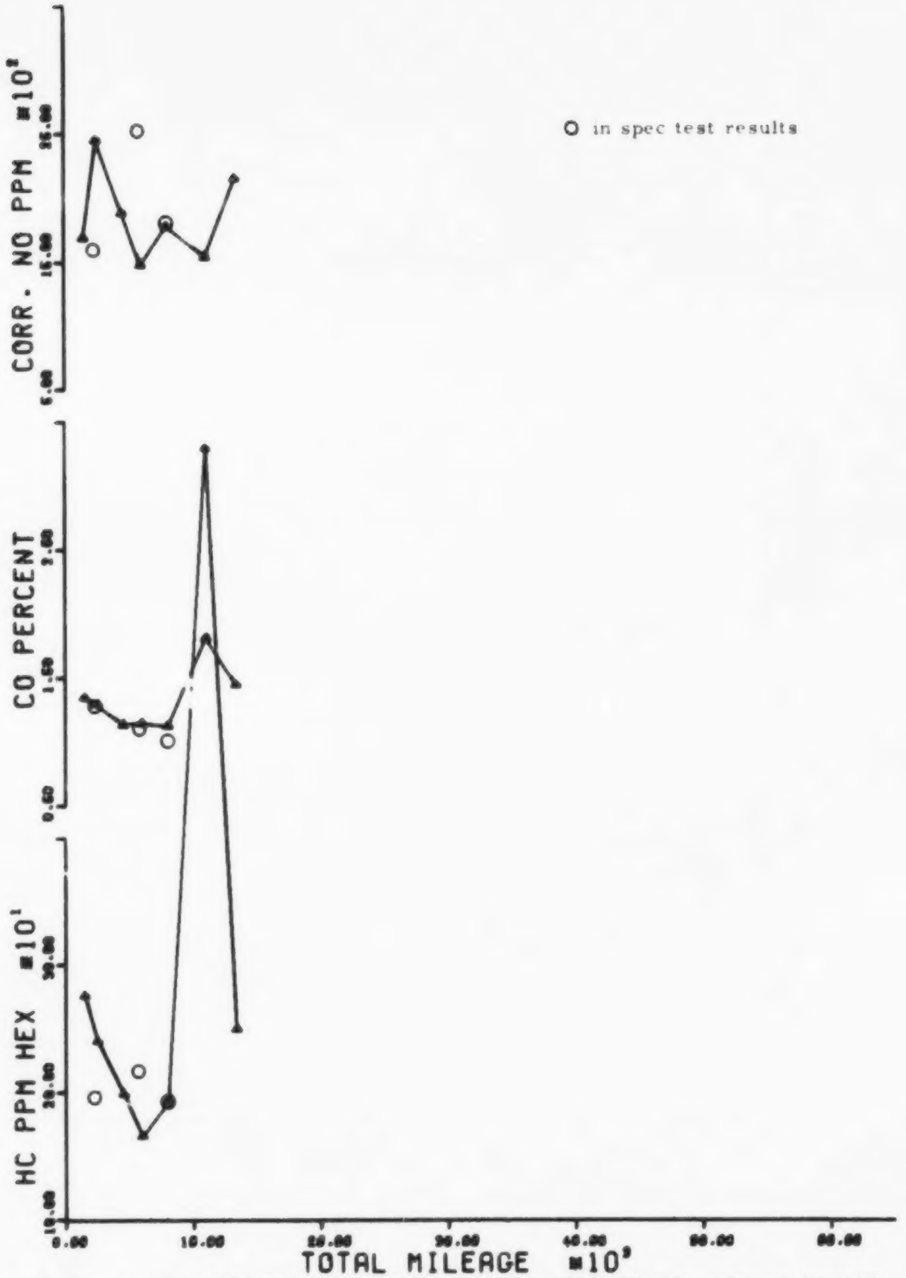


FIGURE E-58 UNIT 058 70 IHC 19700 LB GVW SERVICE 304 CID V8 ENGINE

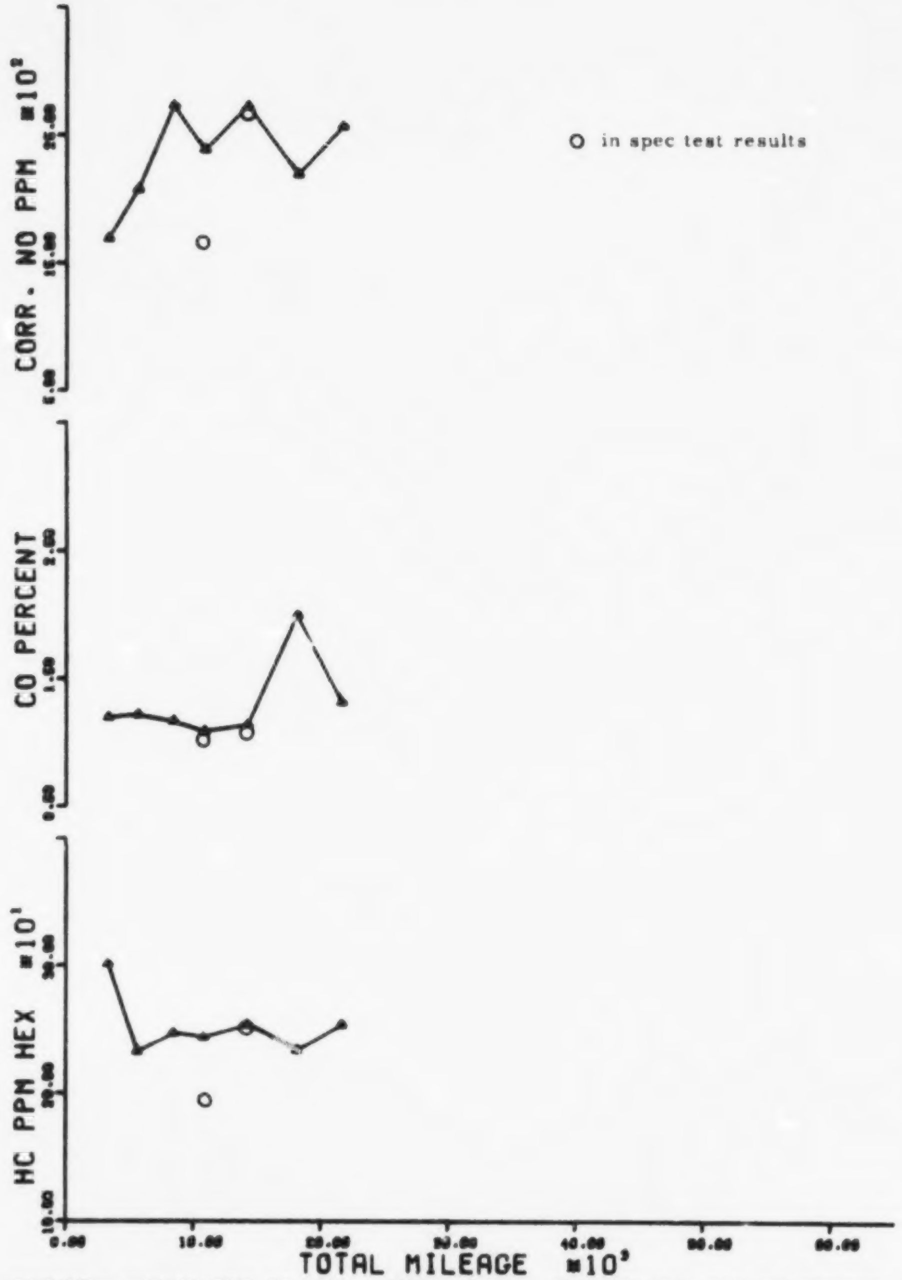


FIGURE E-59 UNIT 059 70 IHC 18700 LB GVW SERVICE 304 CID V8 ENGINE

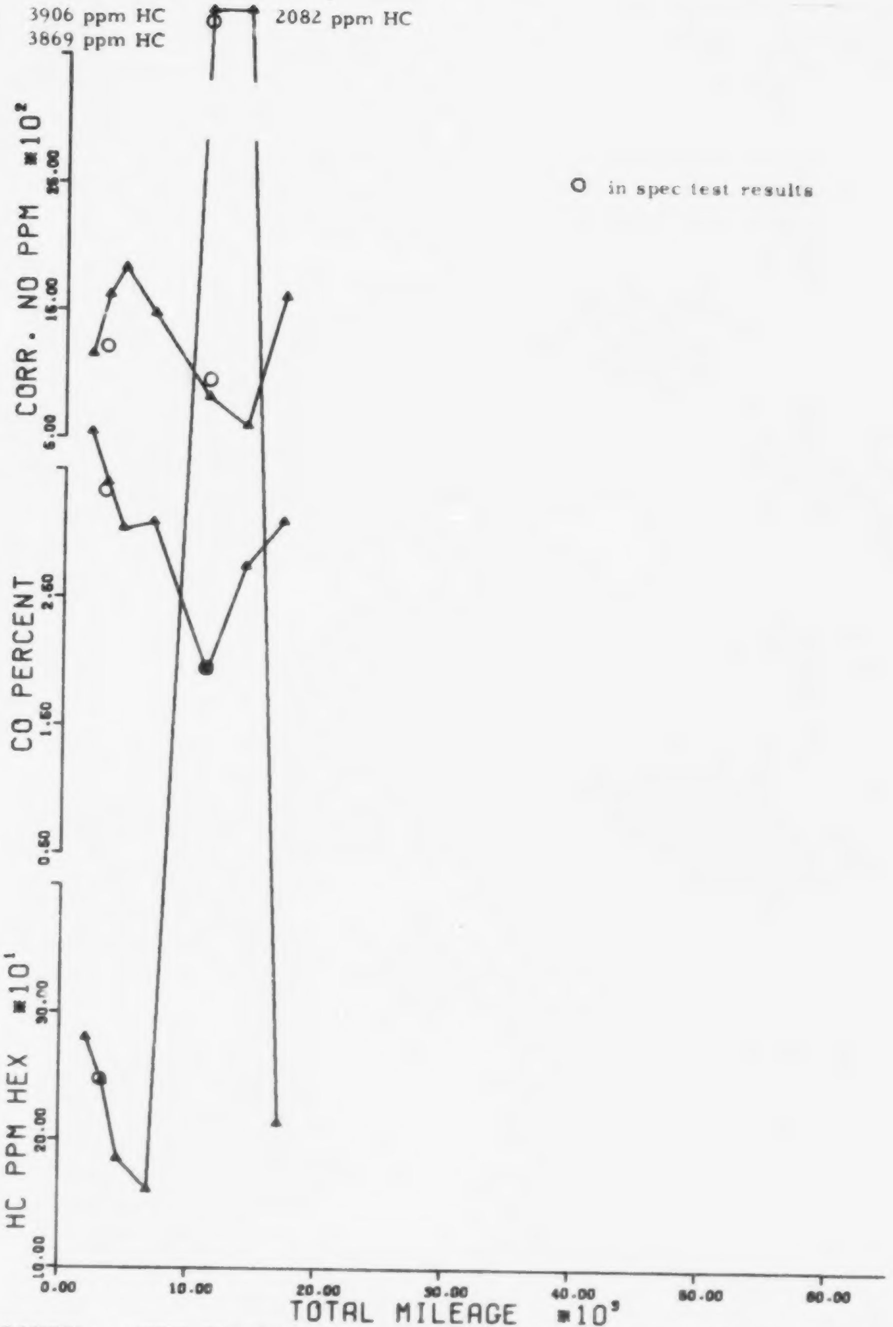


FIGURE E-60 UNIT 060 70 CHEV 7500 LB GVW SERVICE 307 CID V8 ENGINE

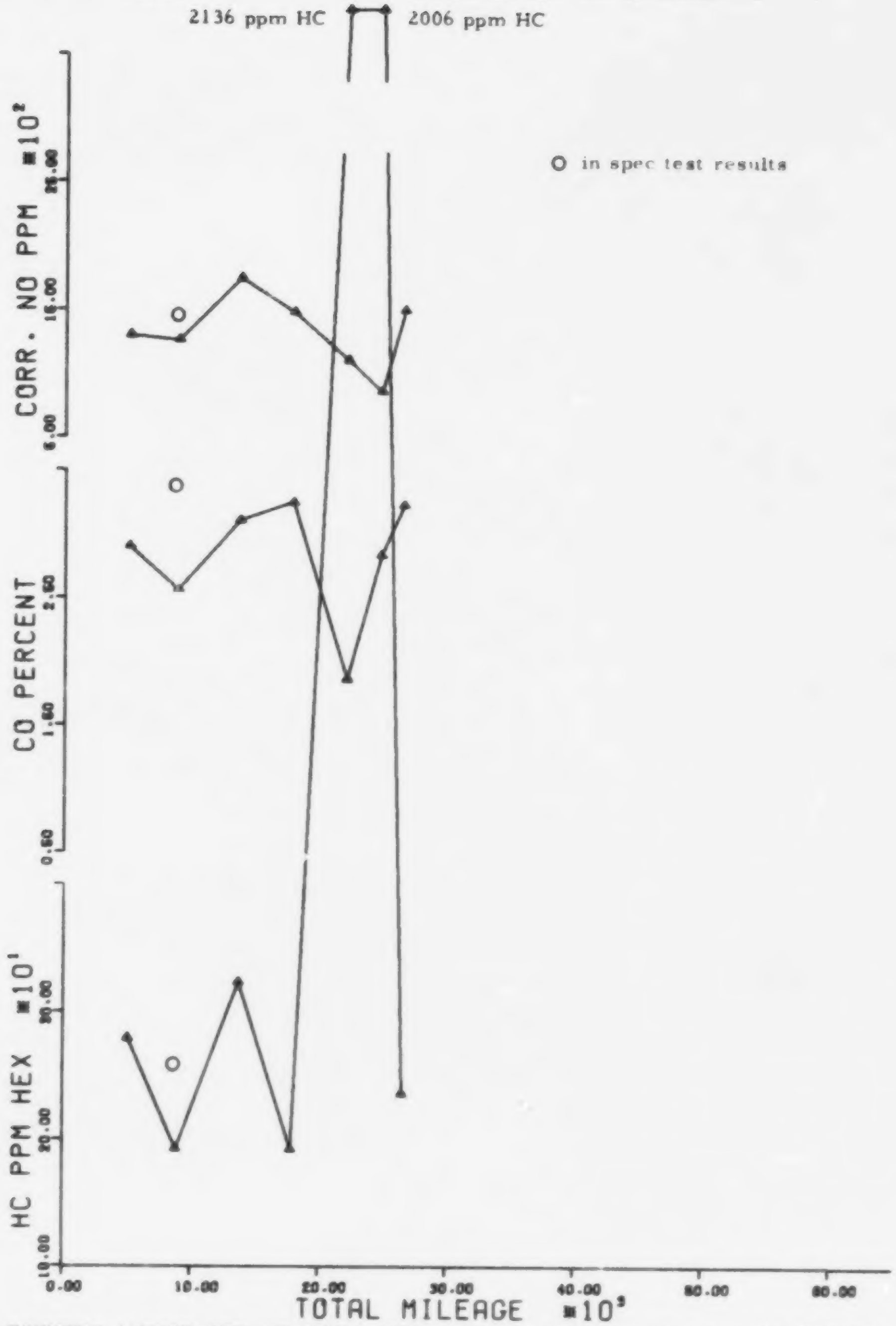


FIGURE E-61 UNIT 061 70 CHEV 7500 LB GVW SERVICE 307 CID V8 ENGINE

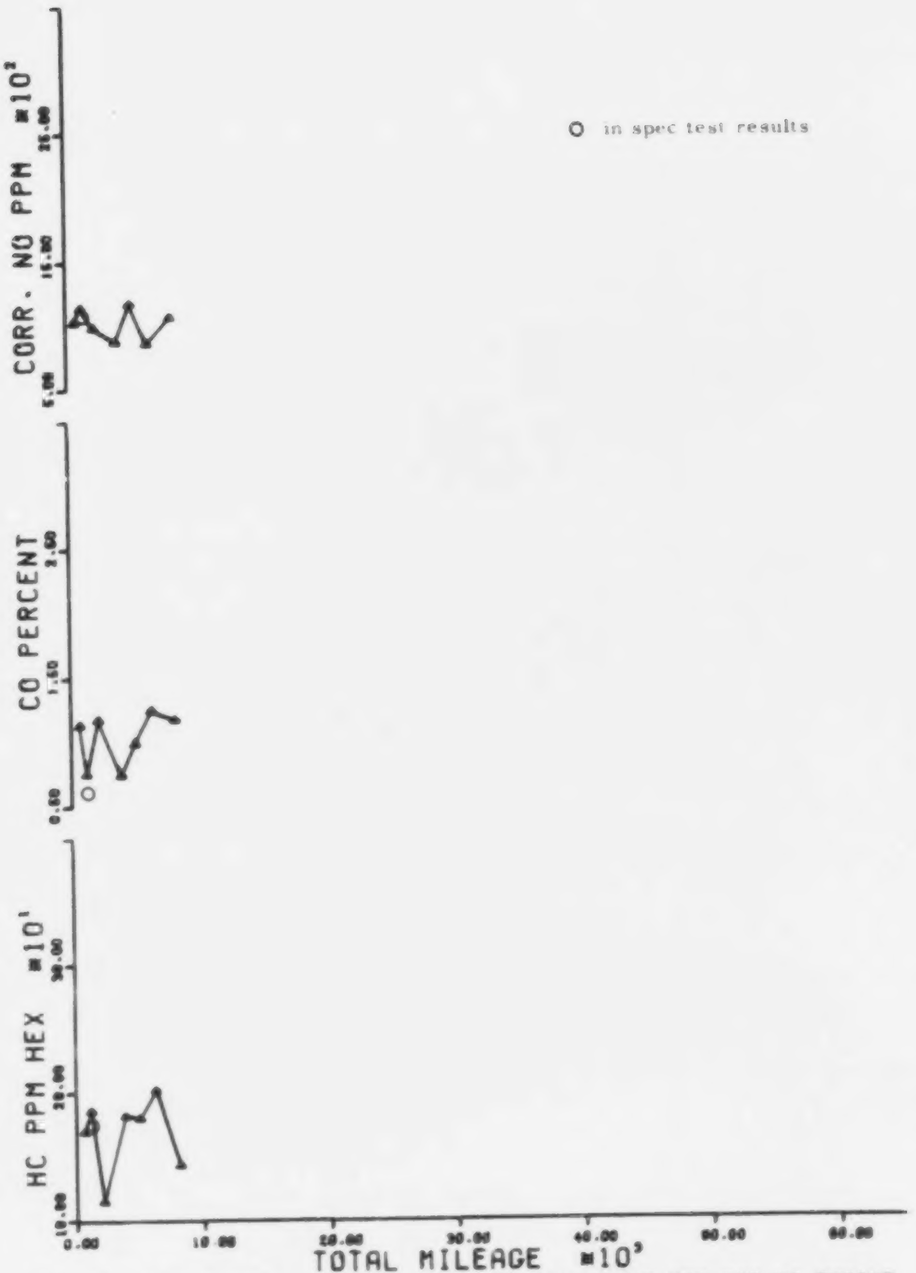


FIGURE E-62 UNIT 062   70 CHEV 32000 LB GVW CRANE 366 CID V8 ENGINE

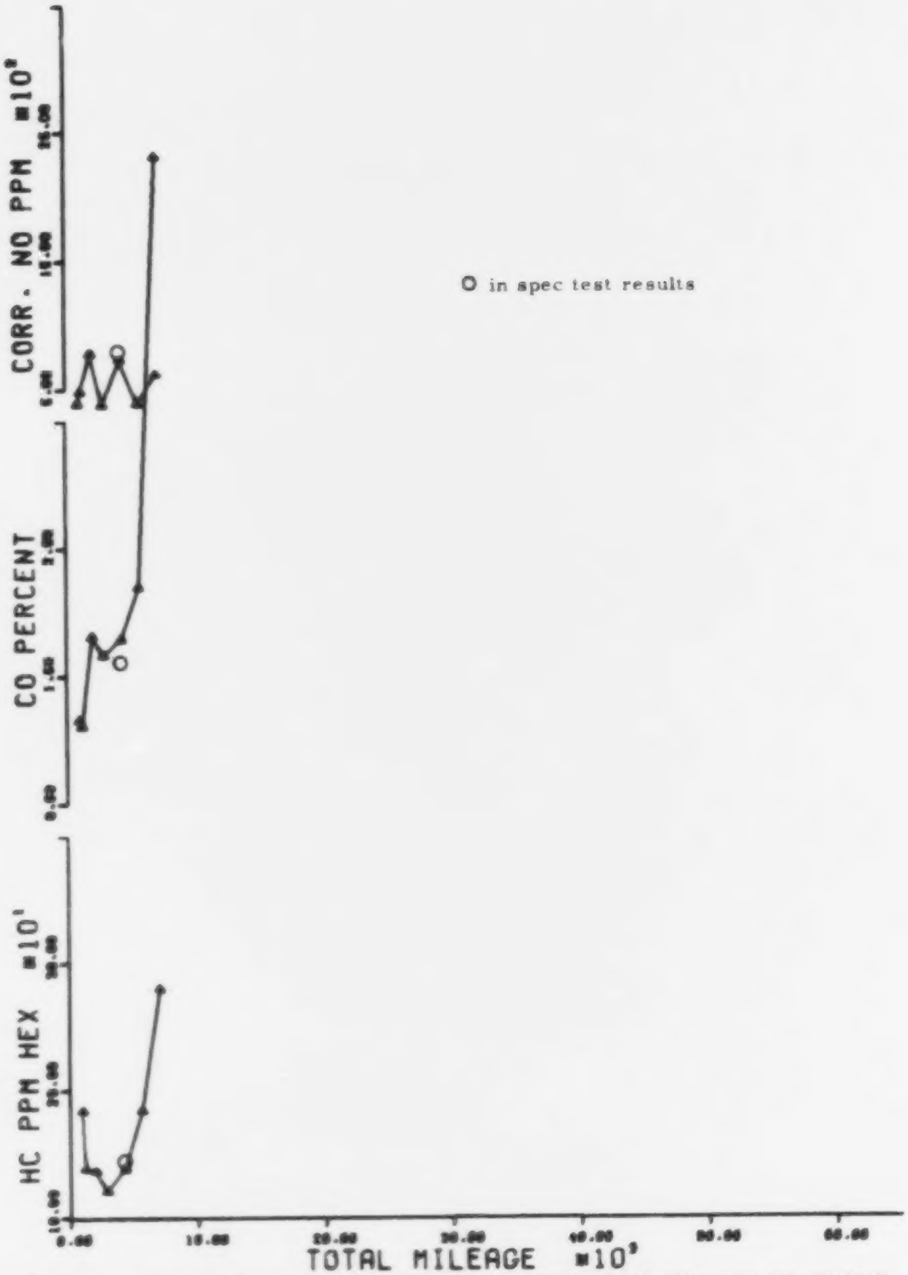
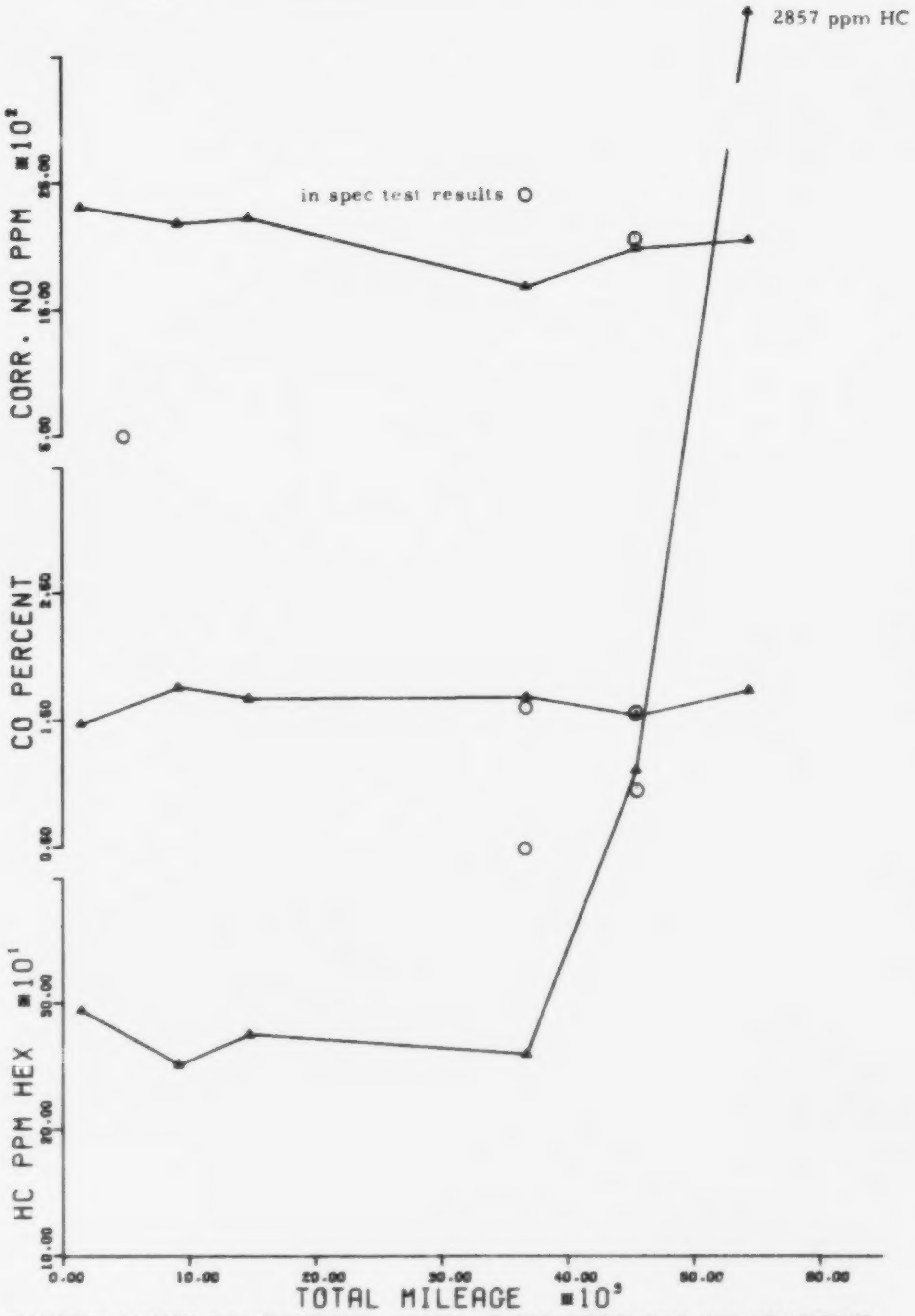


FIGURE E-63 UNIT 063 70 CHEV 32000 LB GVW CRANE 366 CID V8 ENGINE



FIGUREE-64UNIT 064 70 DODGE 24000 LB GVW FRGHT 318 CID V8 ENGINE

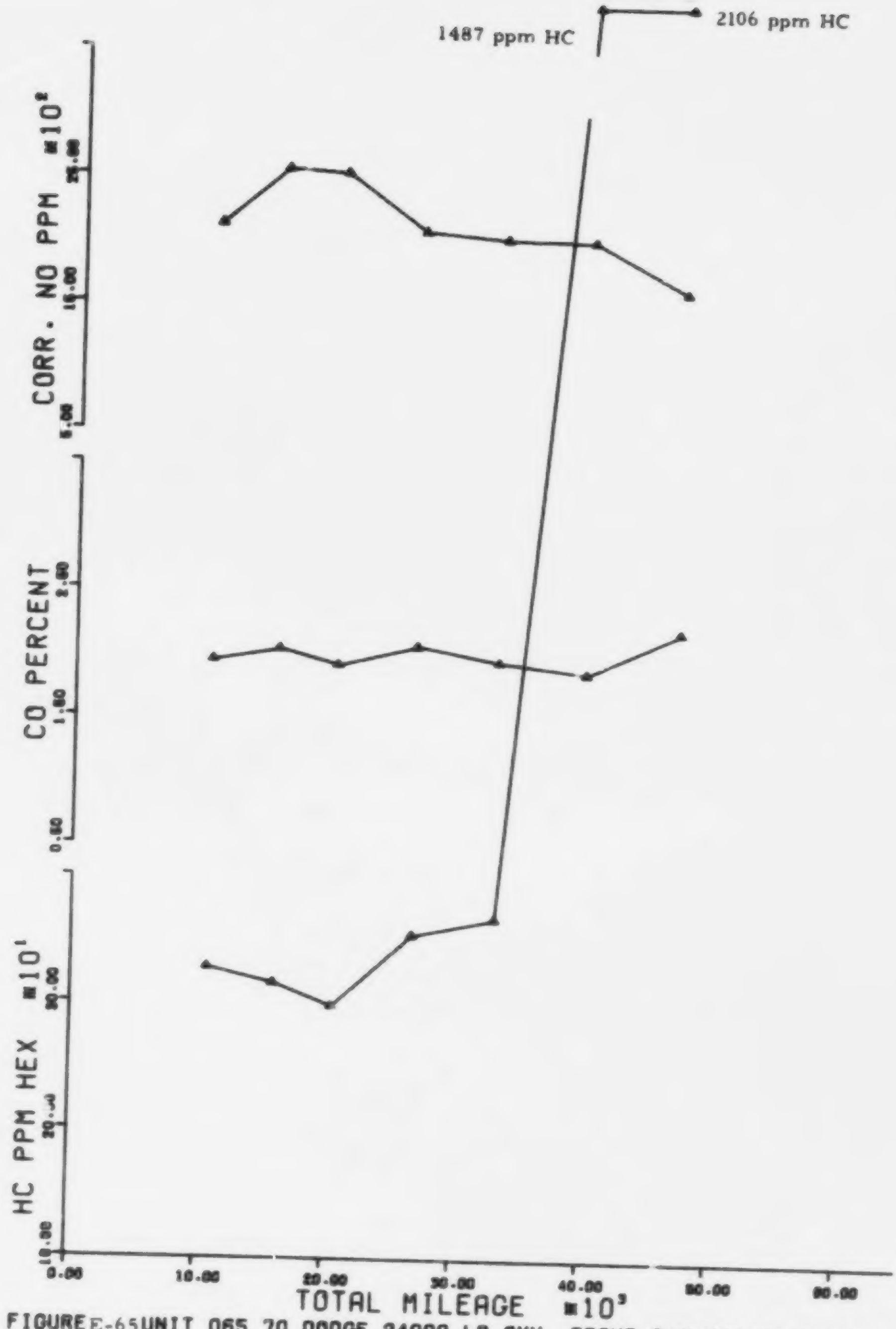


FIGURE E-65 UNIT 065 70 DODGE 24000 LB GVW FRGHT 318 CID V8 ENGINE

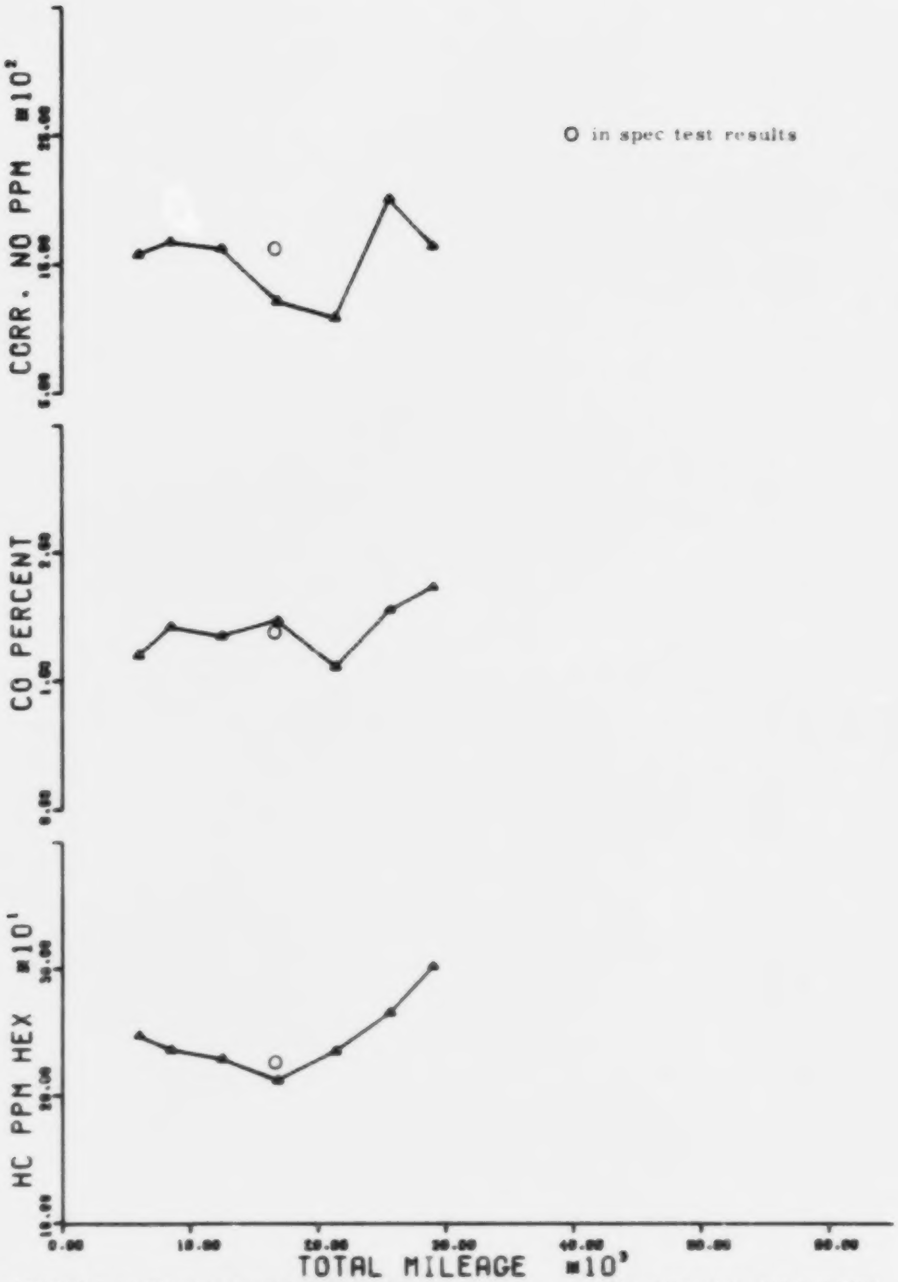


FIGURE E-66 UNIT 066 70 DODGE 7500 LB GVW METER 318 CID V8 ENGINE

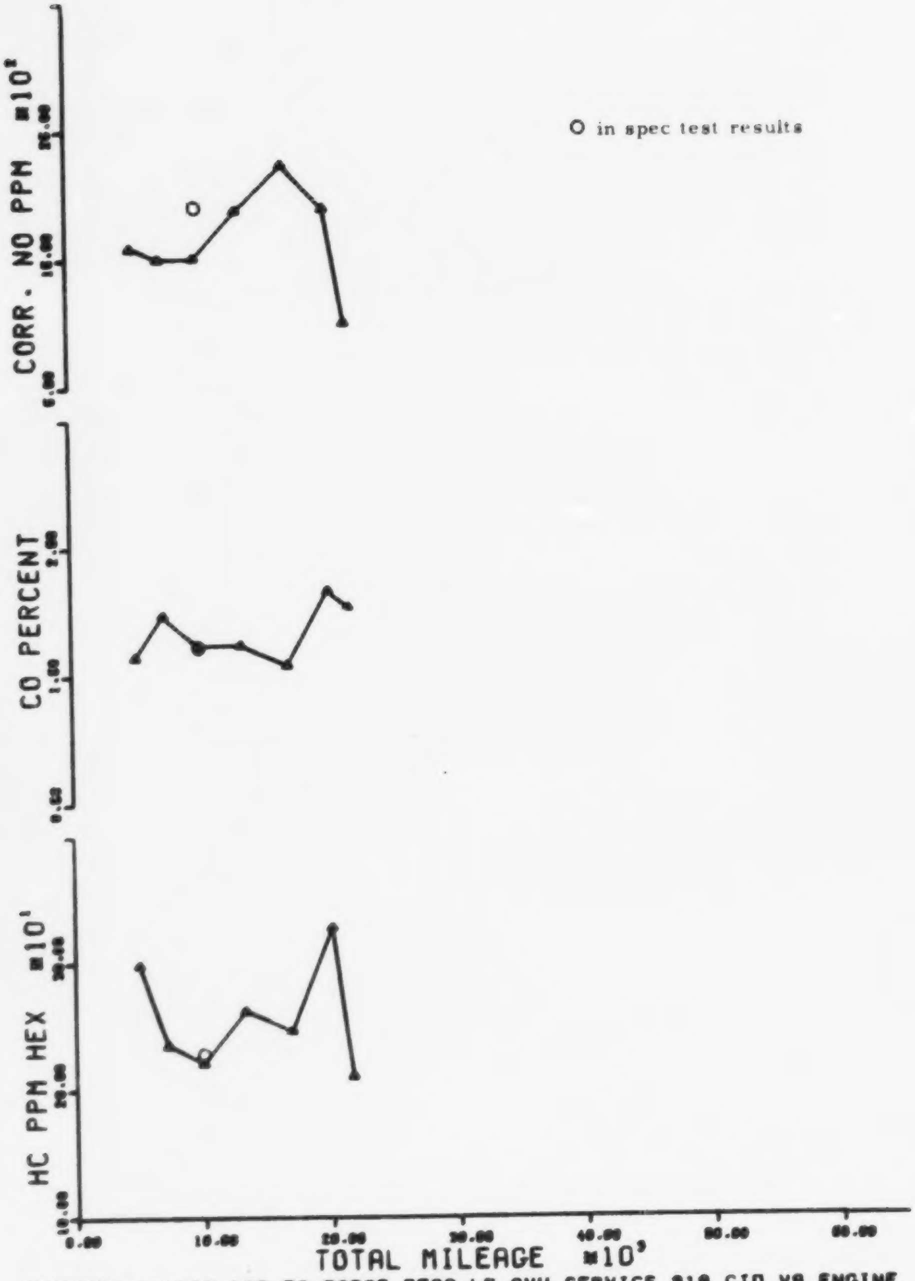


FIGURE E-67 UNIT 067 70 DODGE 7500 LB GVW SERVICE 318 CID V8 ENGINE

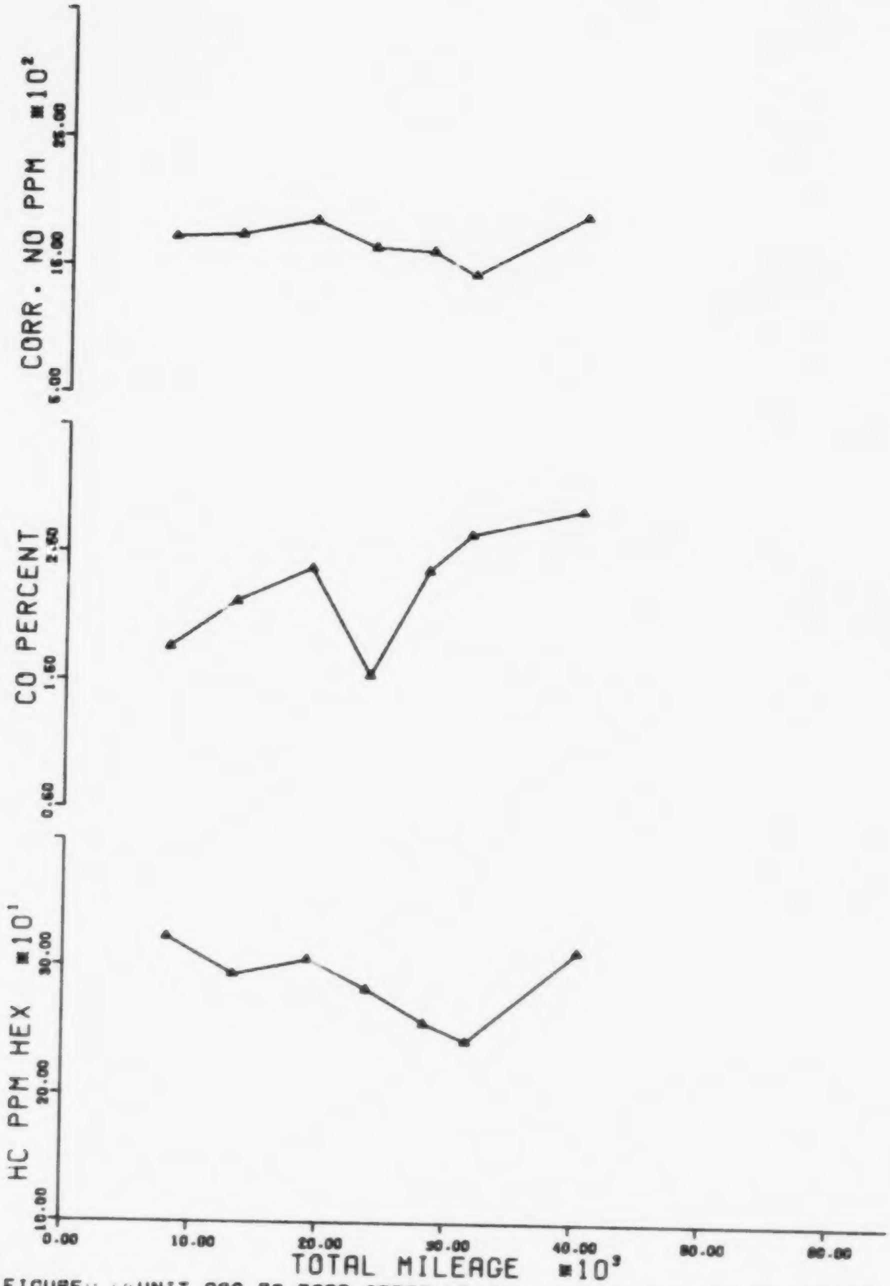


FIGURE E-68 UNIT 068 70 FORD 25500 LB GVW DUMP 361 CID V8 ENGINE

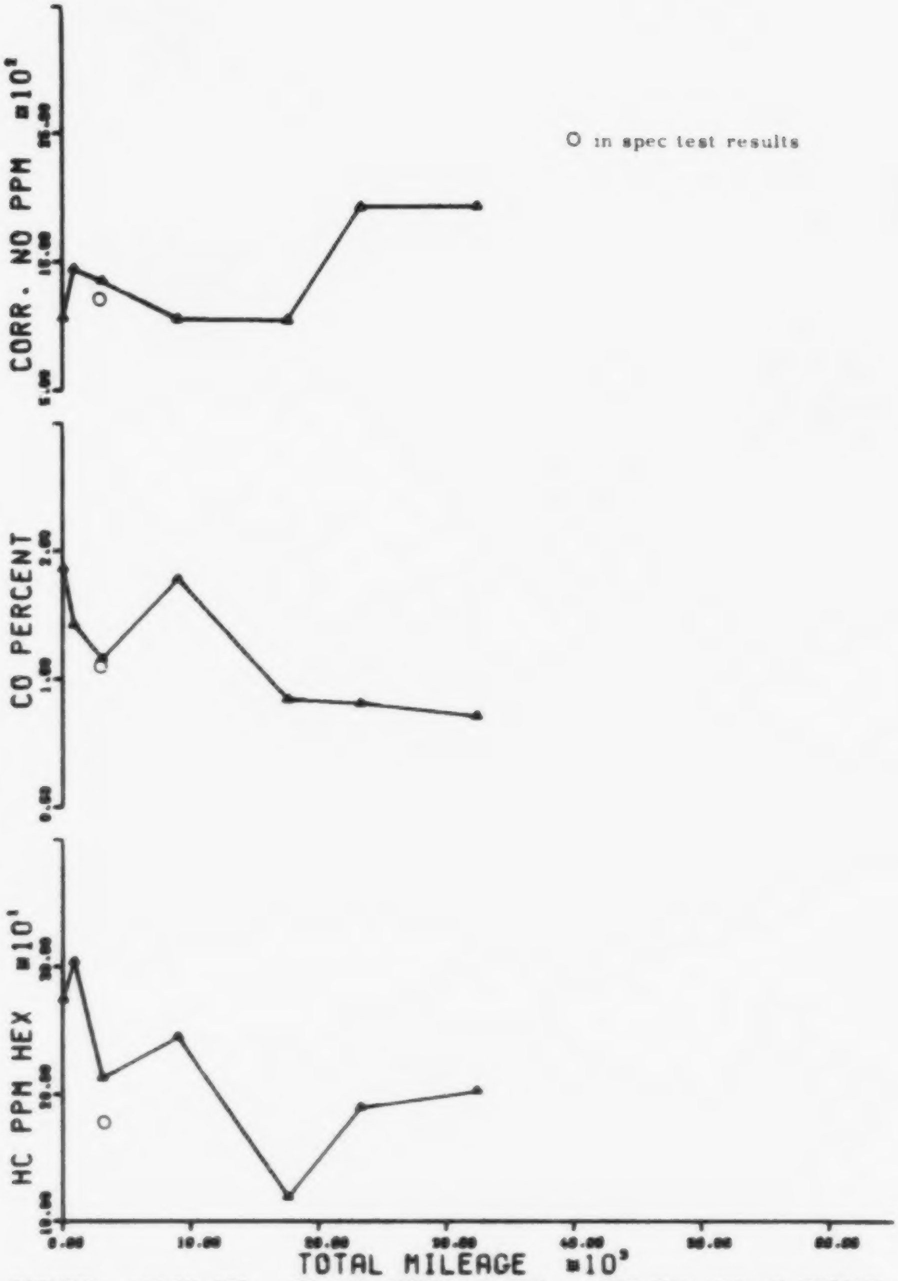


FIGURE E-69 UNIT 069 70 IHC 25500 LB GVW LINE 392 CID V8 ENGINE

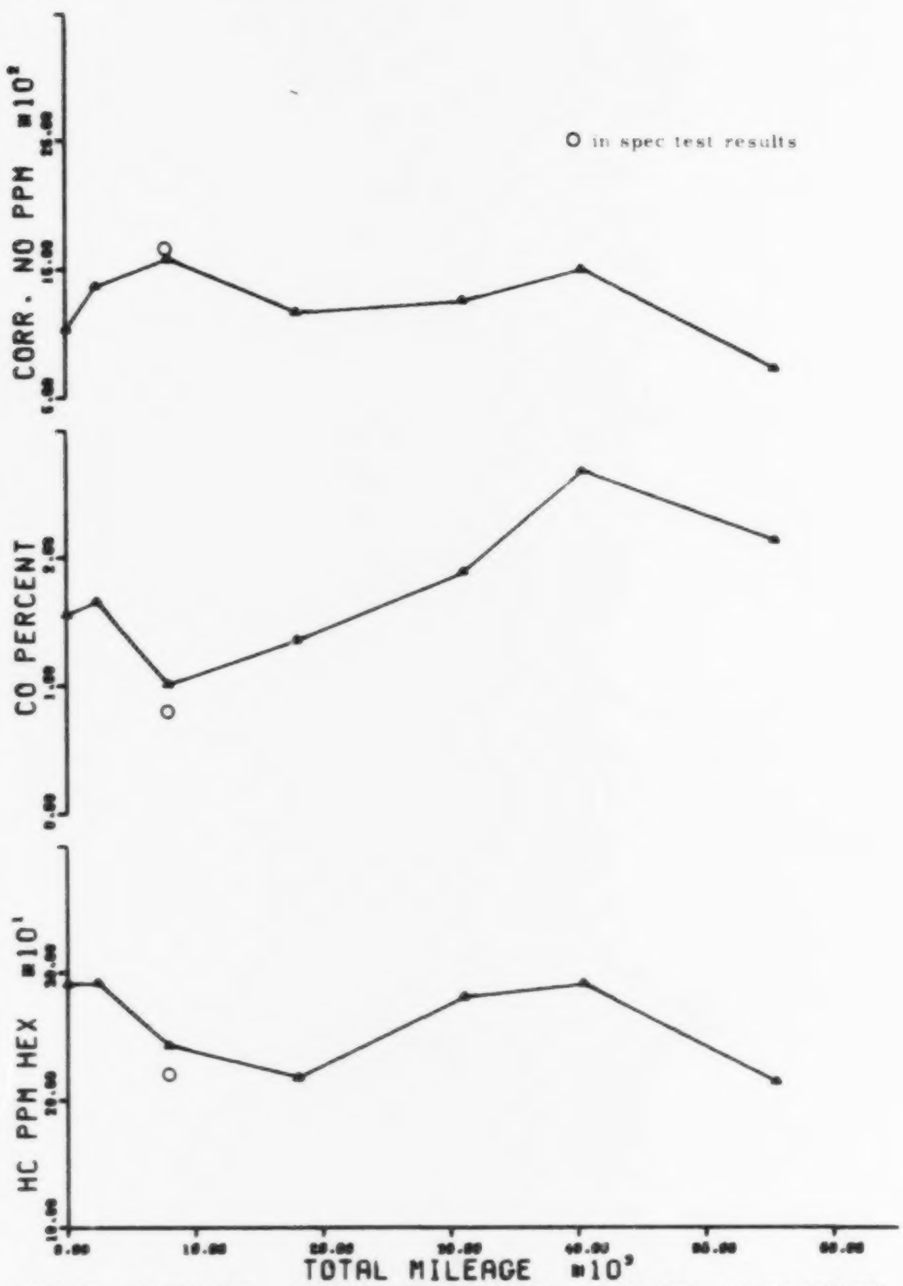


FIGURE E-70 UNIT 070 70 IHC 25500 LB GVW LINE 392 CID V8 ENGINE

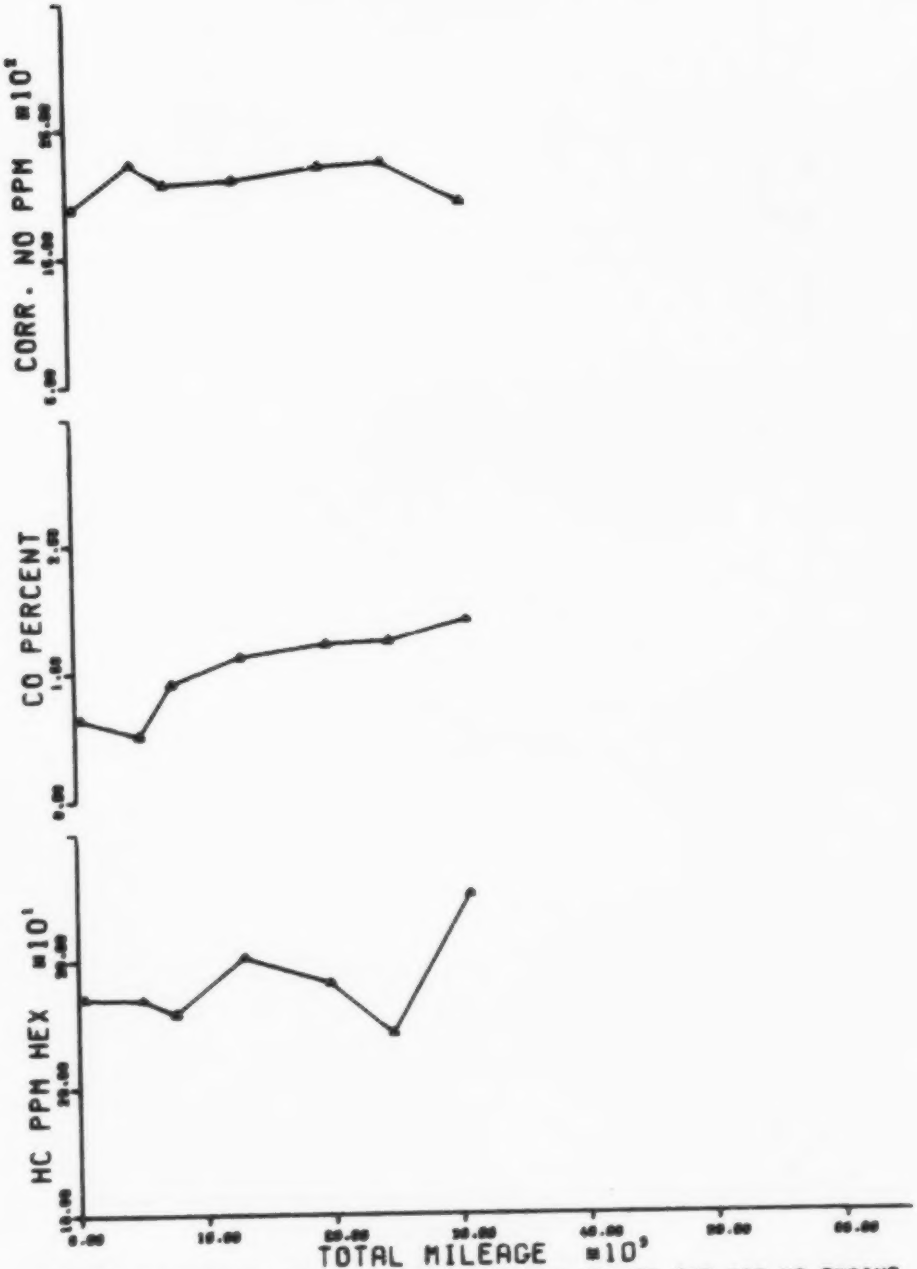


FIGURE E-71 UNIT 071 71 IHC 25000 LB GVW DIGGER 345 CID V8 ENGINE

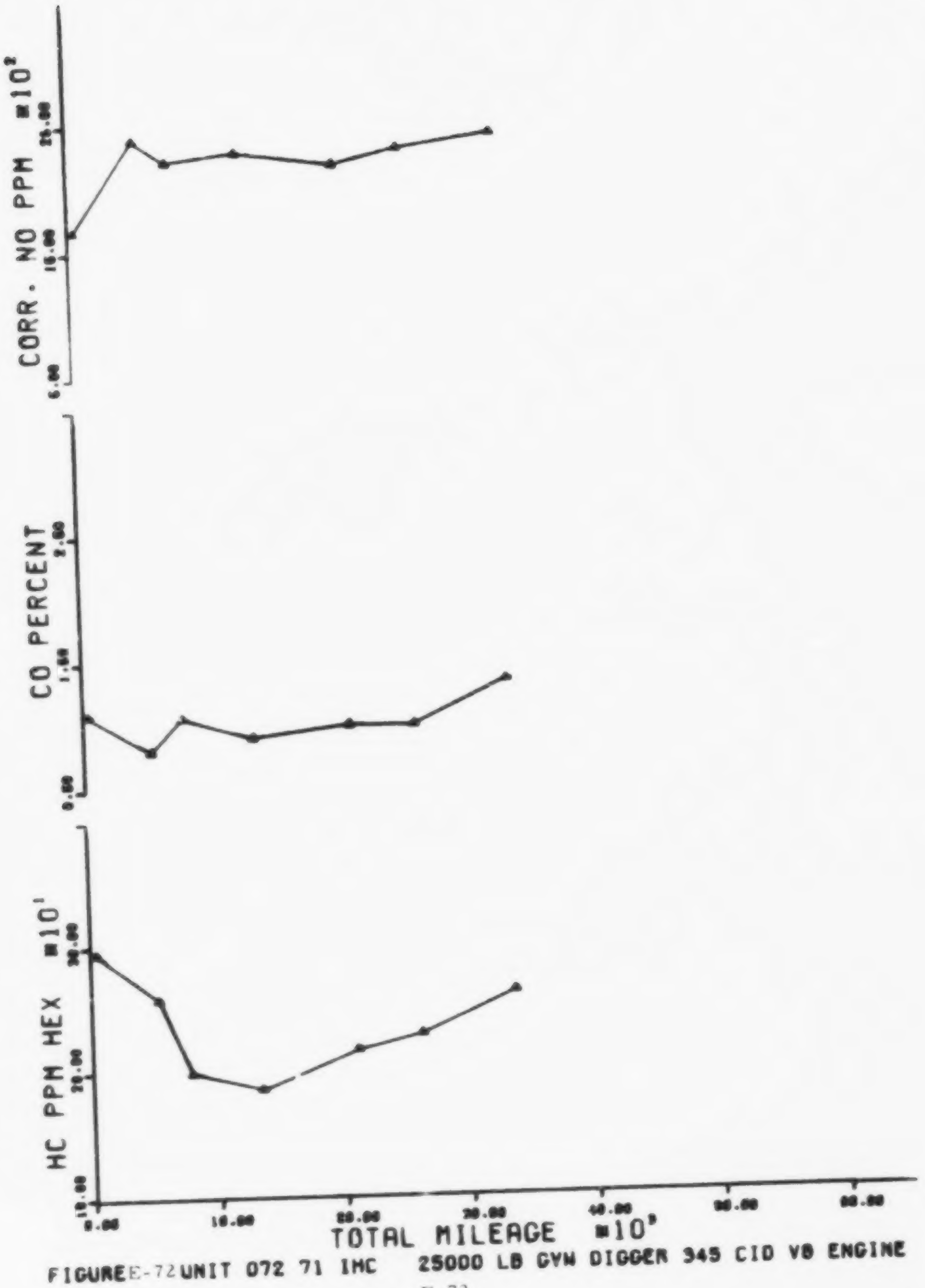


FIGURE E-72 UNIT 072 71 IHC 25000 LB GYW DIGGER 345 CID V8 ENGINE

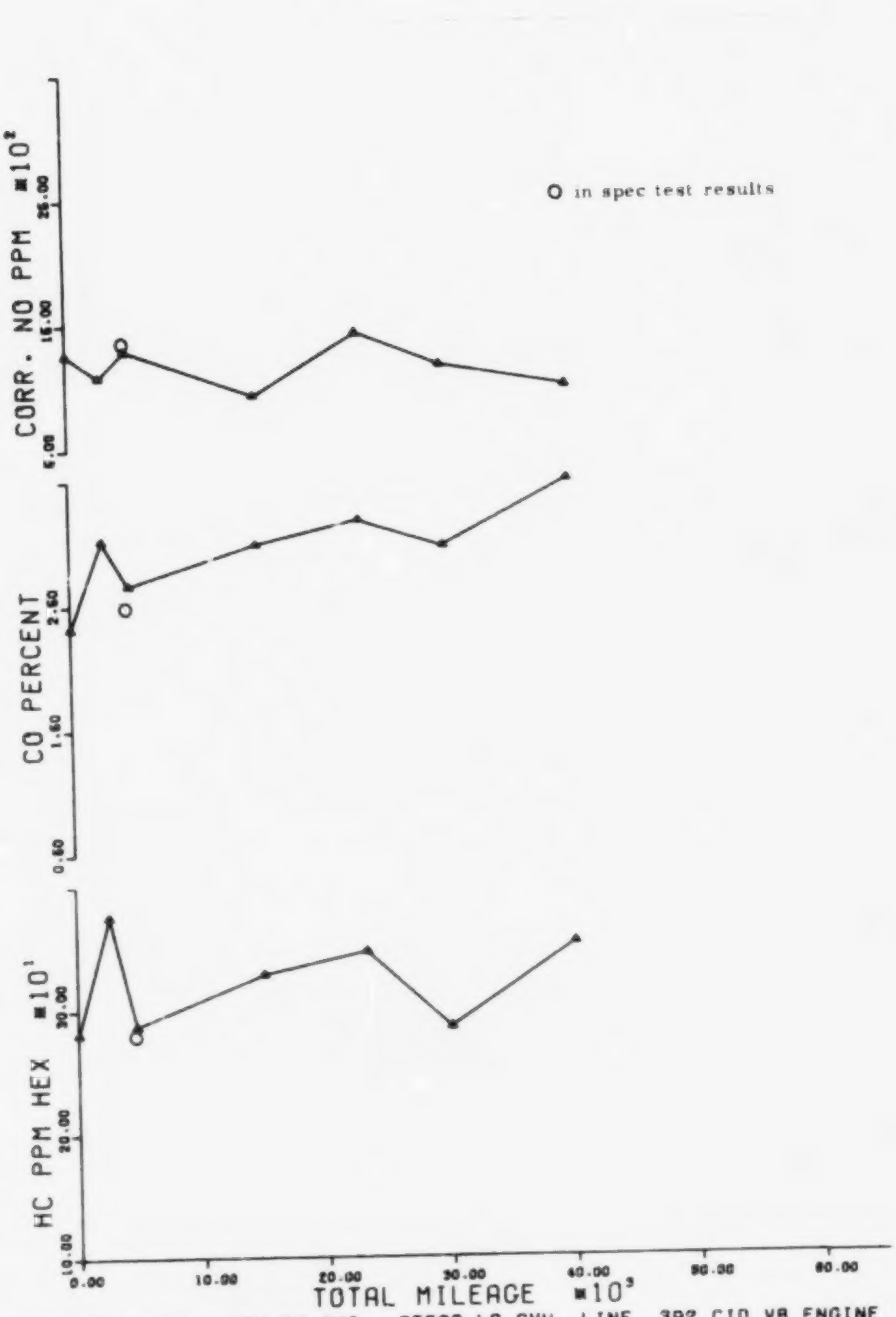


FIGURE E-73 UNIT 073 70 IHC 25500 LB GVW LINE 392 CID V8 ENGINE

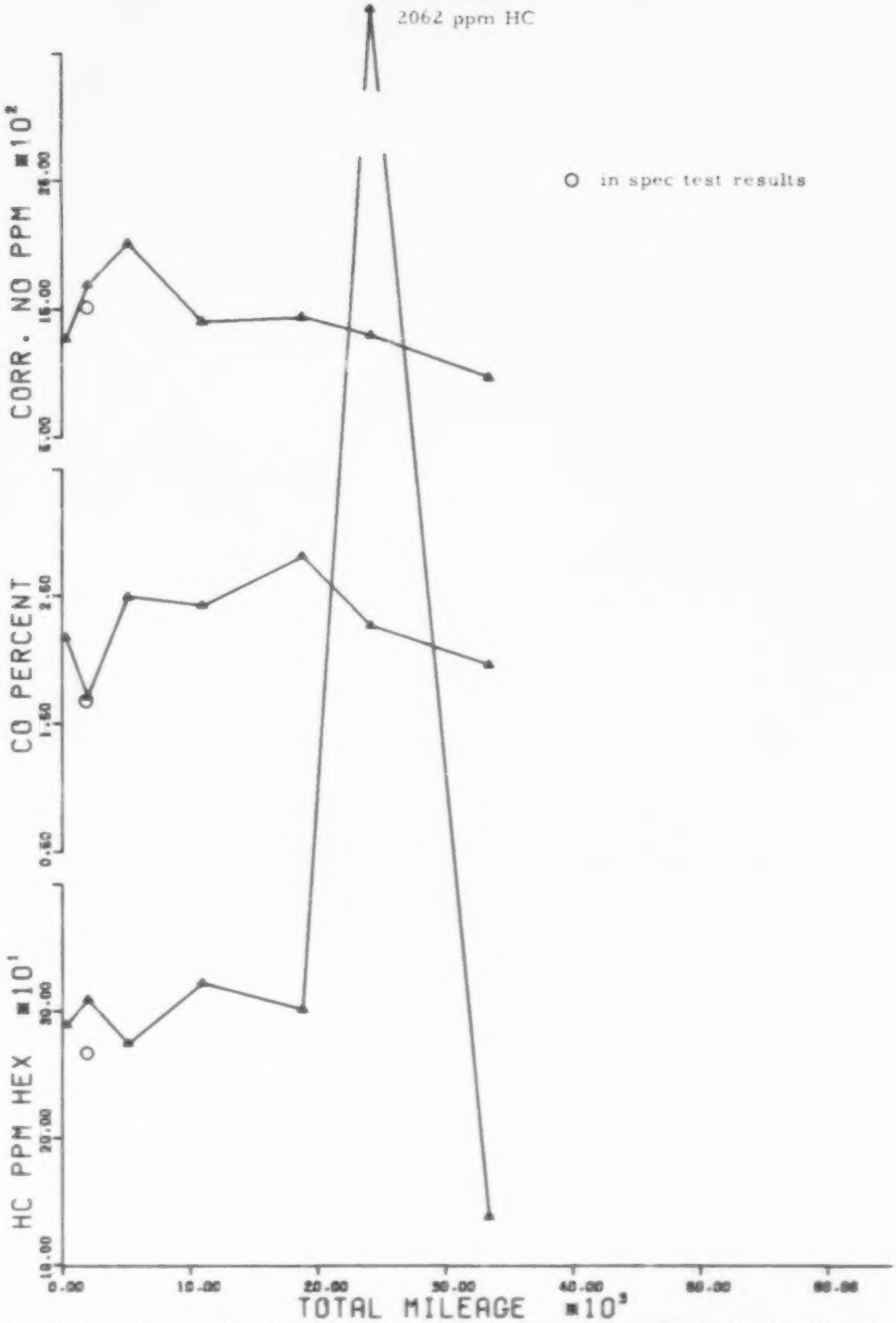


FIGURE E-74 UNIT 074 70 IHC 25500 LB GVW LINE 392 CID V8 ENGINE

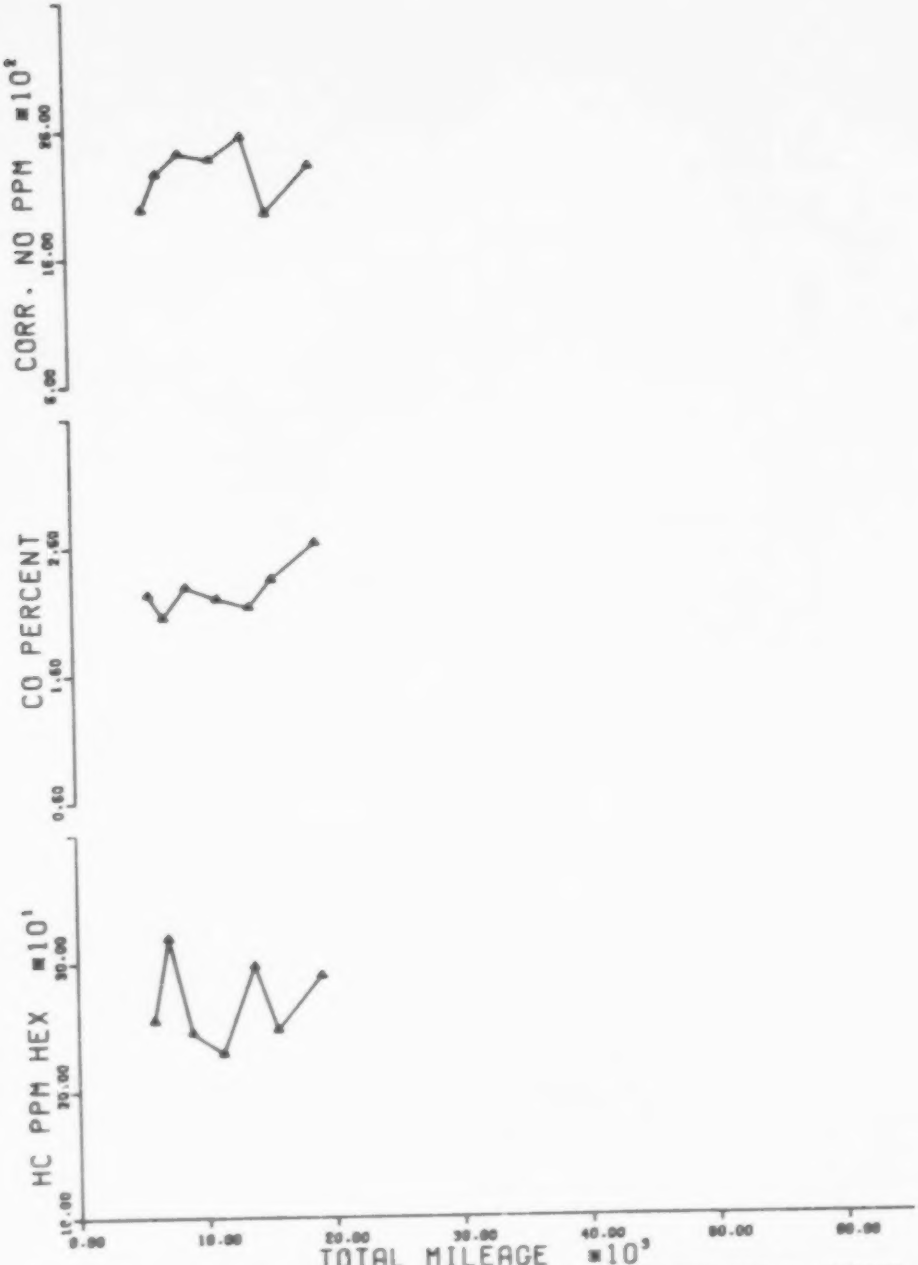


FIGURE E-75 UNIT 075 70 DODGE 7500 LB GVW PICKUP 225 CID 6 ENGINE

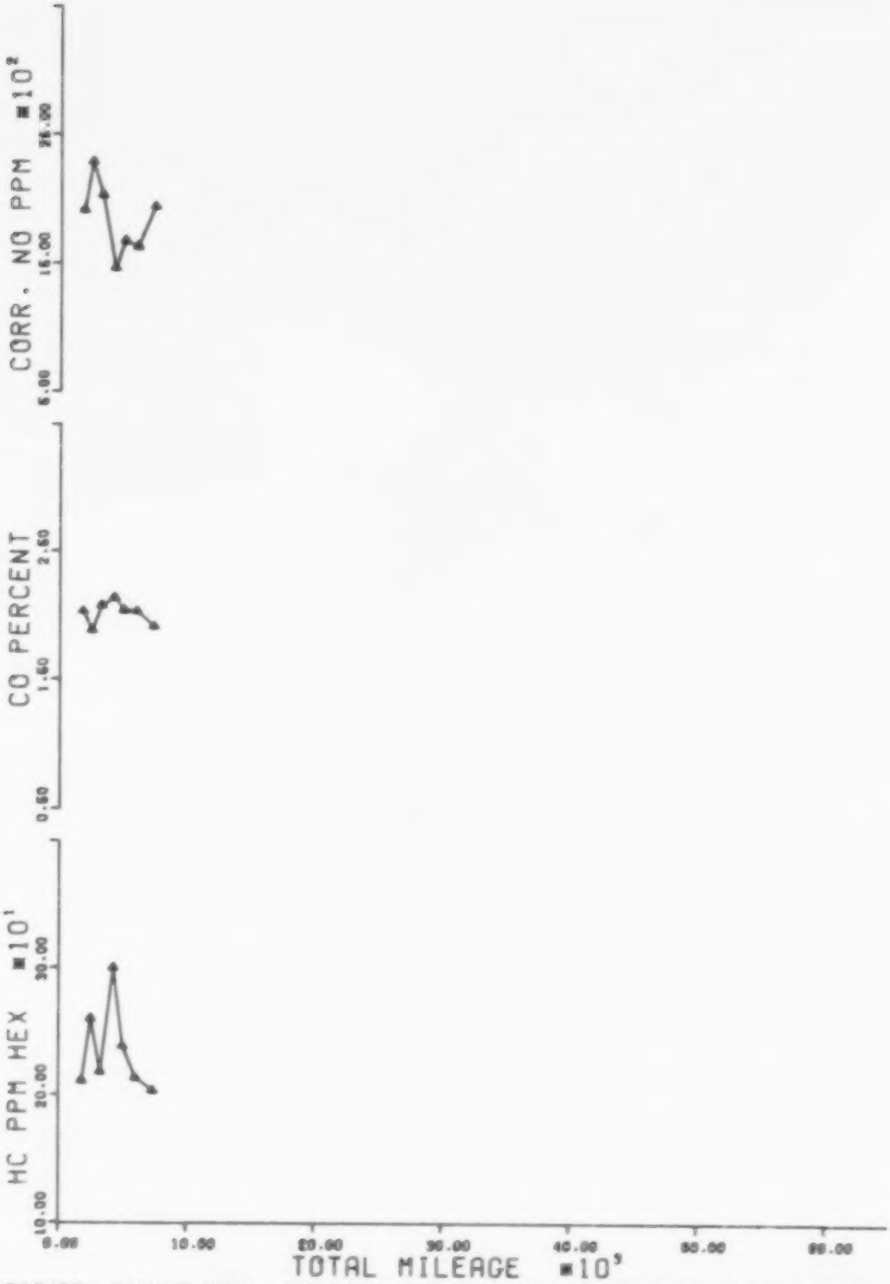


FIGURE E-76 UNIT 076 70 DODGE 7500 LB GVW PICKUP 225 CID I6 ENGINE

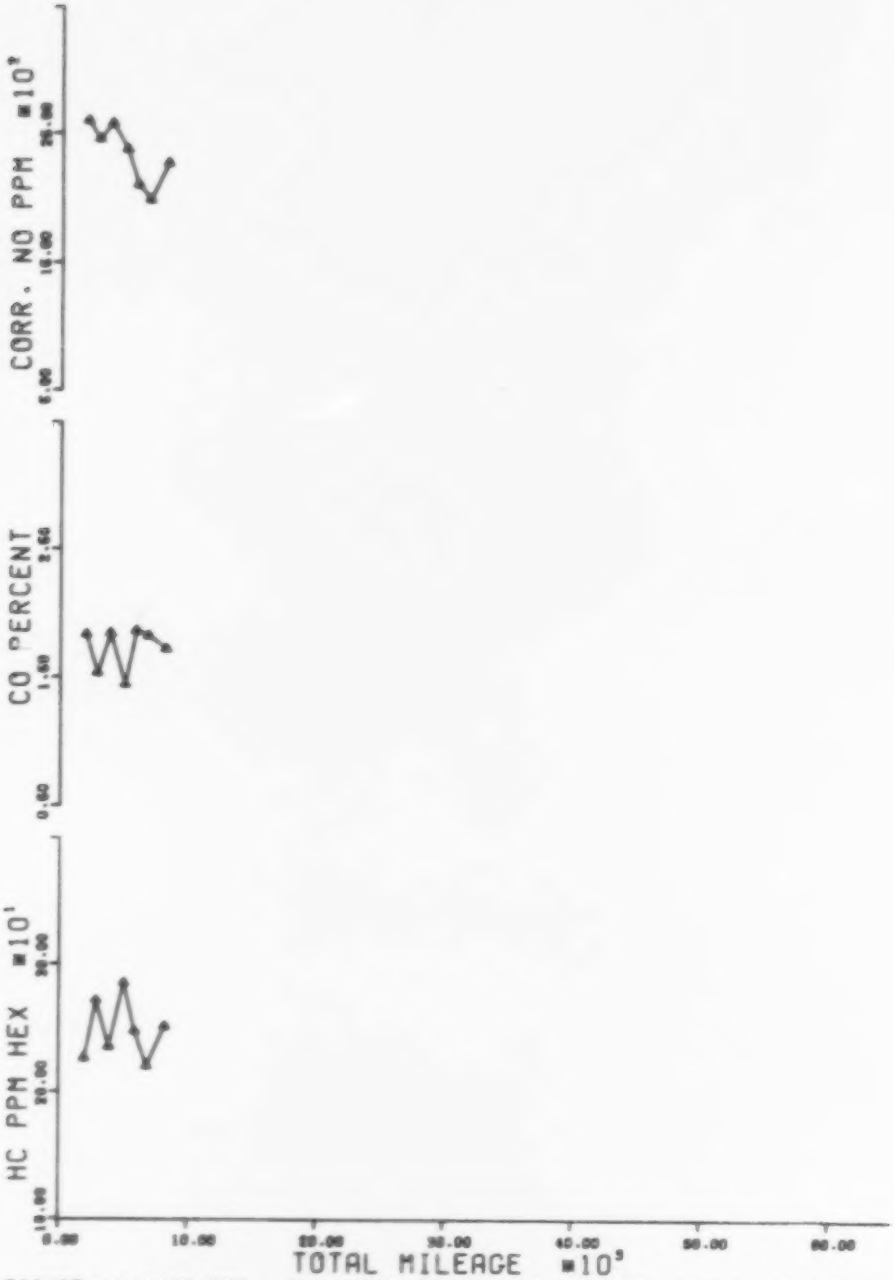


FIGURE E-77 UNIT 077 70 DODGE 7500 LB GVW PICKUP 225 CID I6 ENGINE

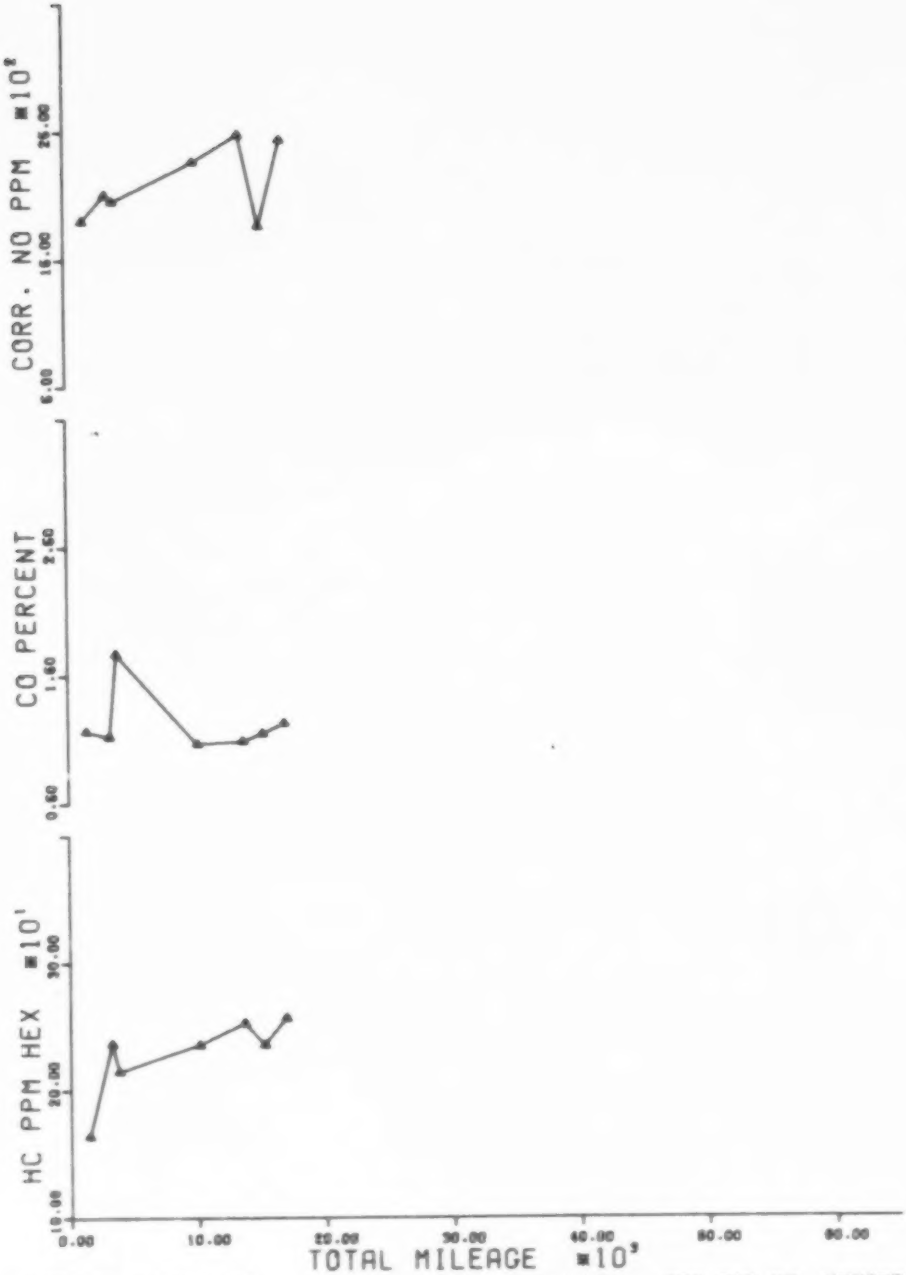


FIGURE E-78 UNIT 078 70 FORD 6800 LB GVW VAN 302 CID V8 ENGINE

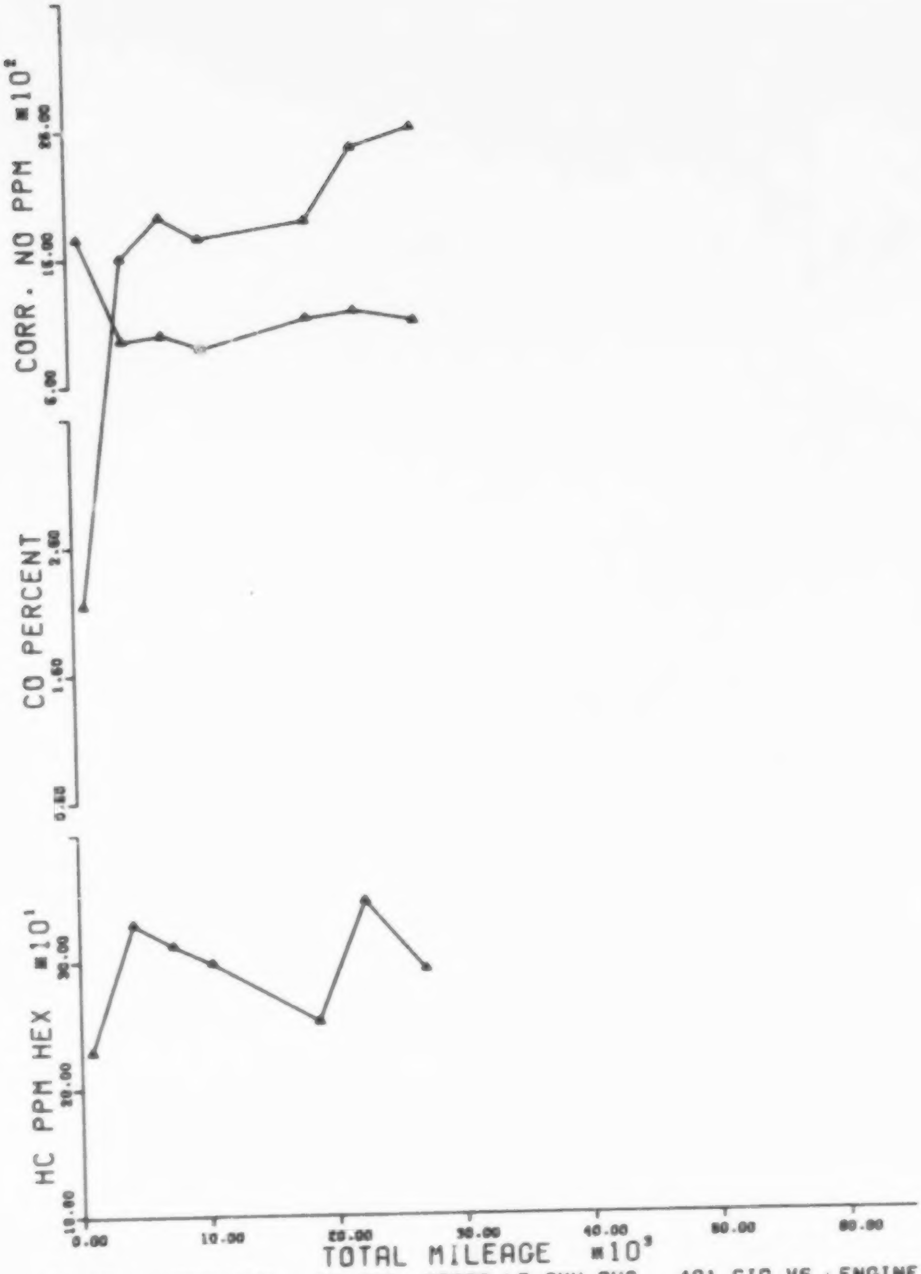


FIGURE E-79 UNIT 079 70 GMC 27000 LB GVW BUS 401 CID V6 ENGINE

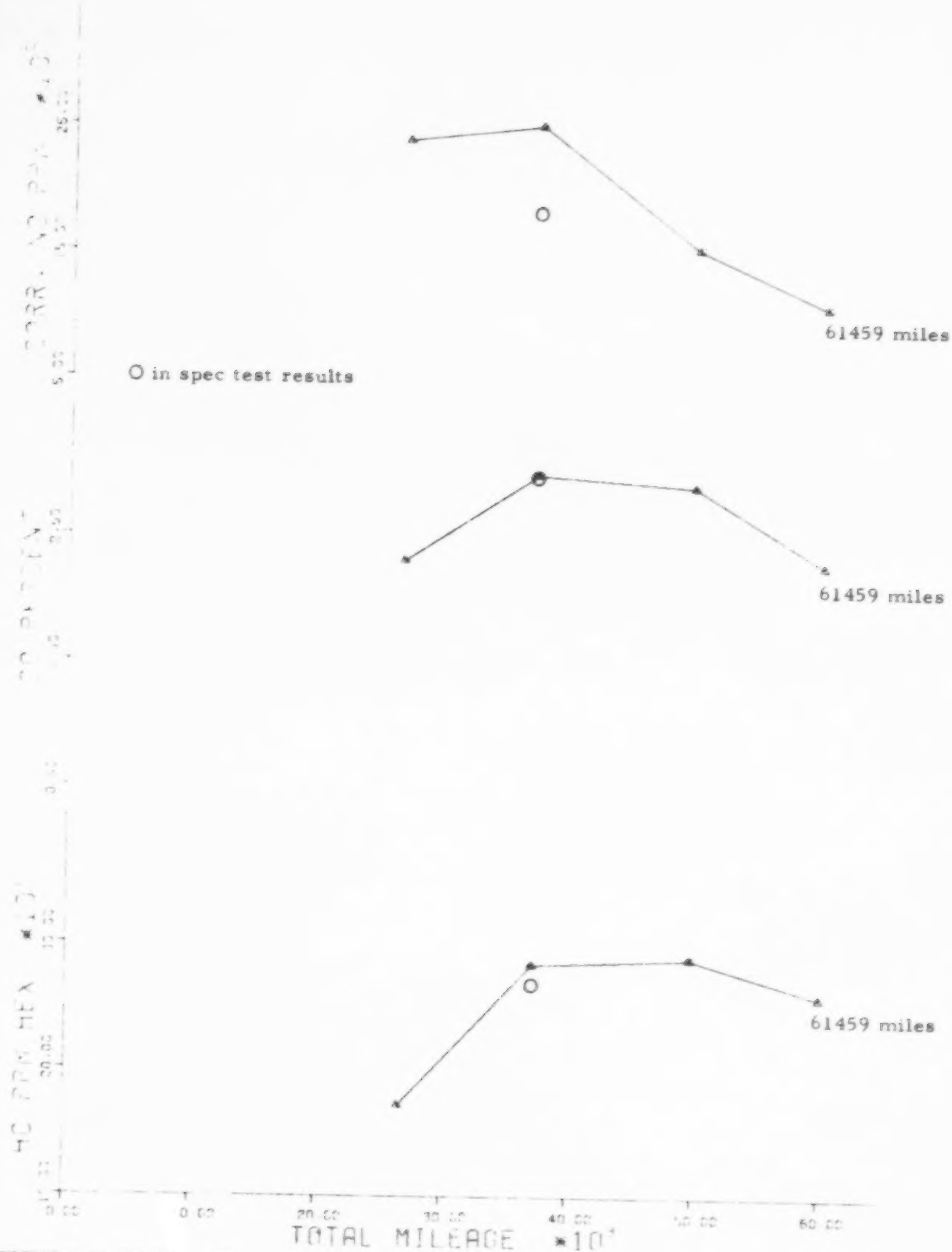


FIGURE E-80 UNIT 080 70 CHEV 6600 LB GVW DELVY 307 CID V8 ENGINE

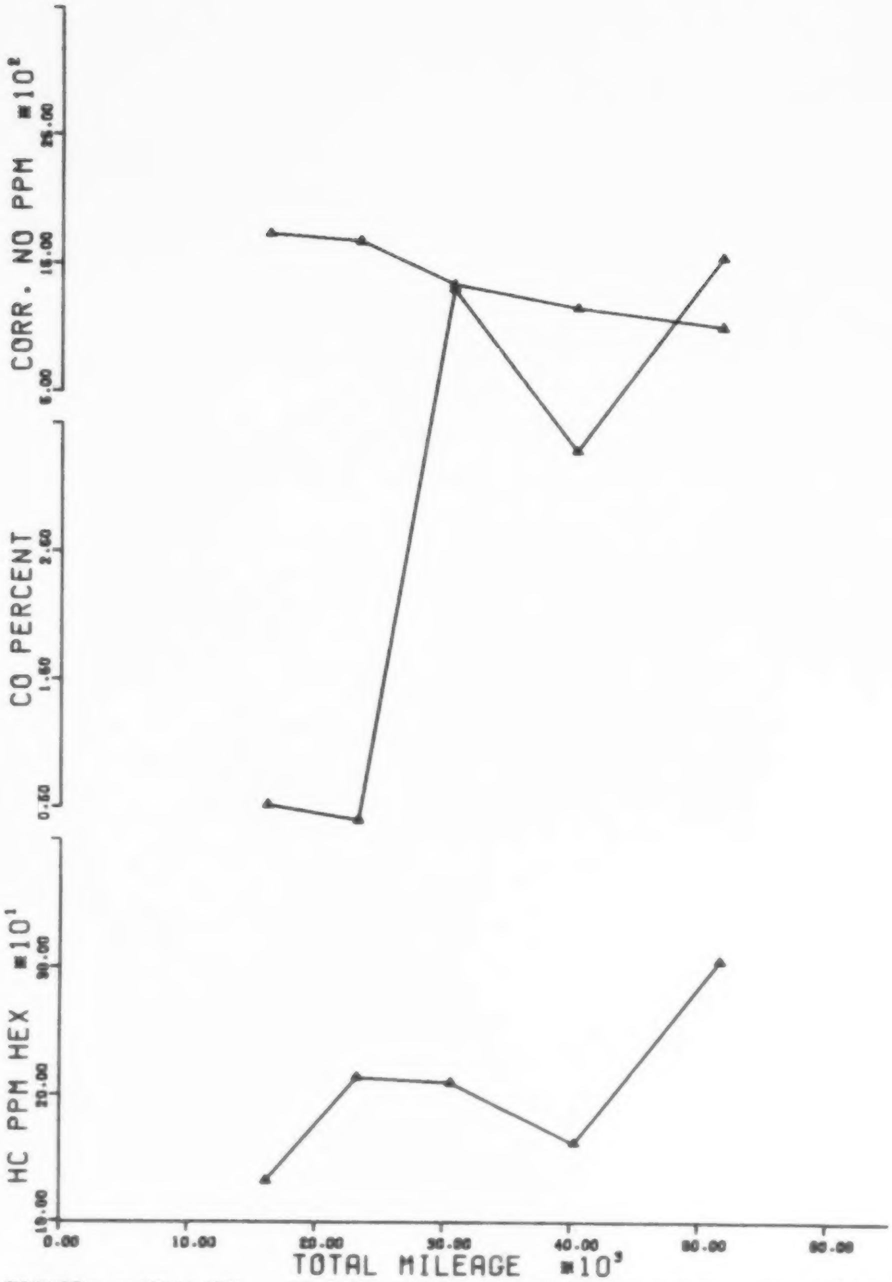


FIGURE E-81 UNIT 081 70 FORD 21000 LB GVW FRGHT 300 CID I6 ENGINE

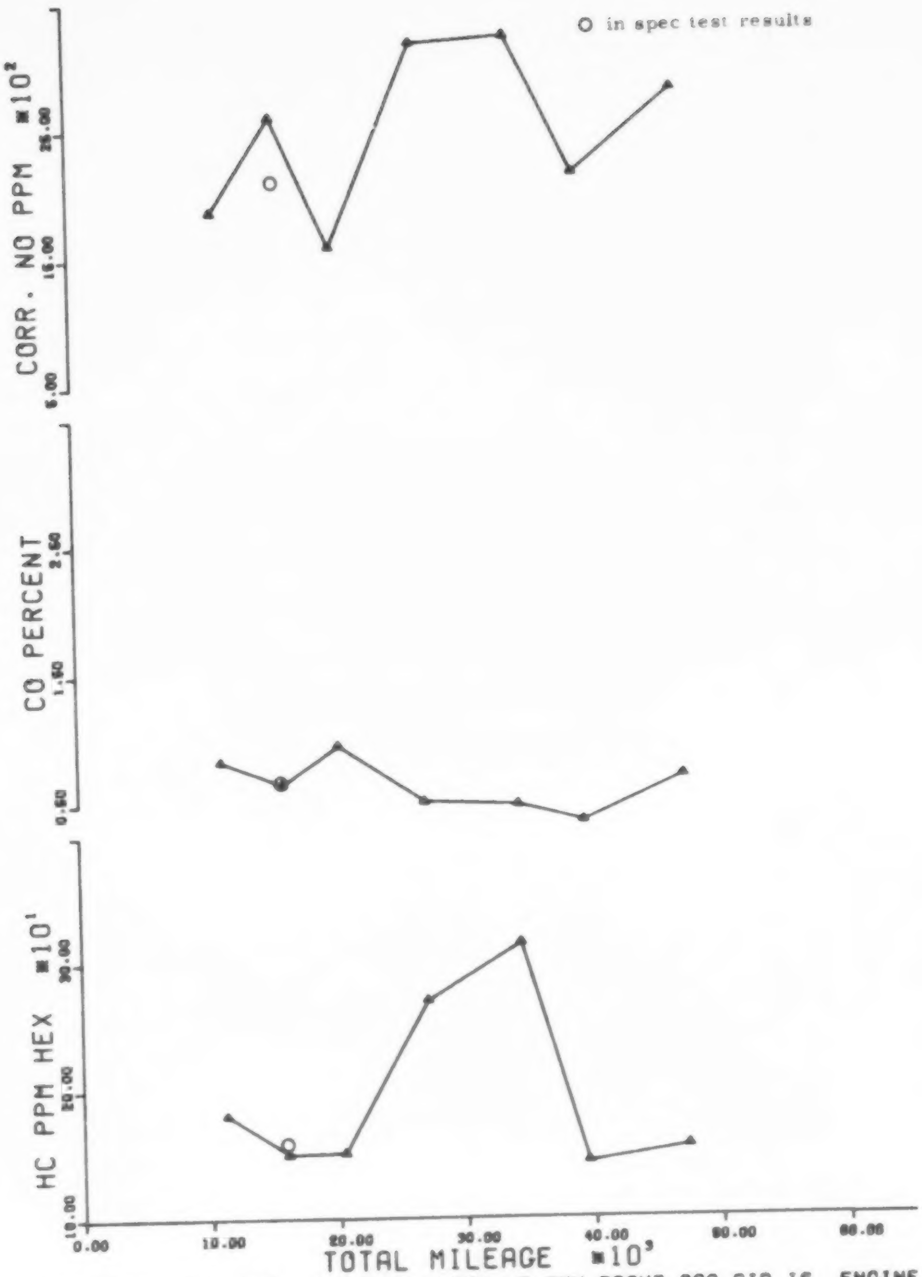


FIGURE E-82 UNIT 082 70 FORD 21000 LB GVW FRGHT 300 CID I6 ENGINE

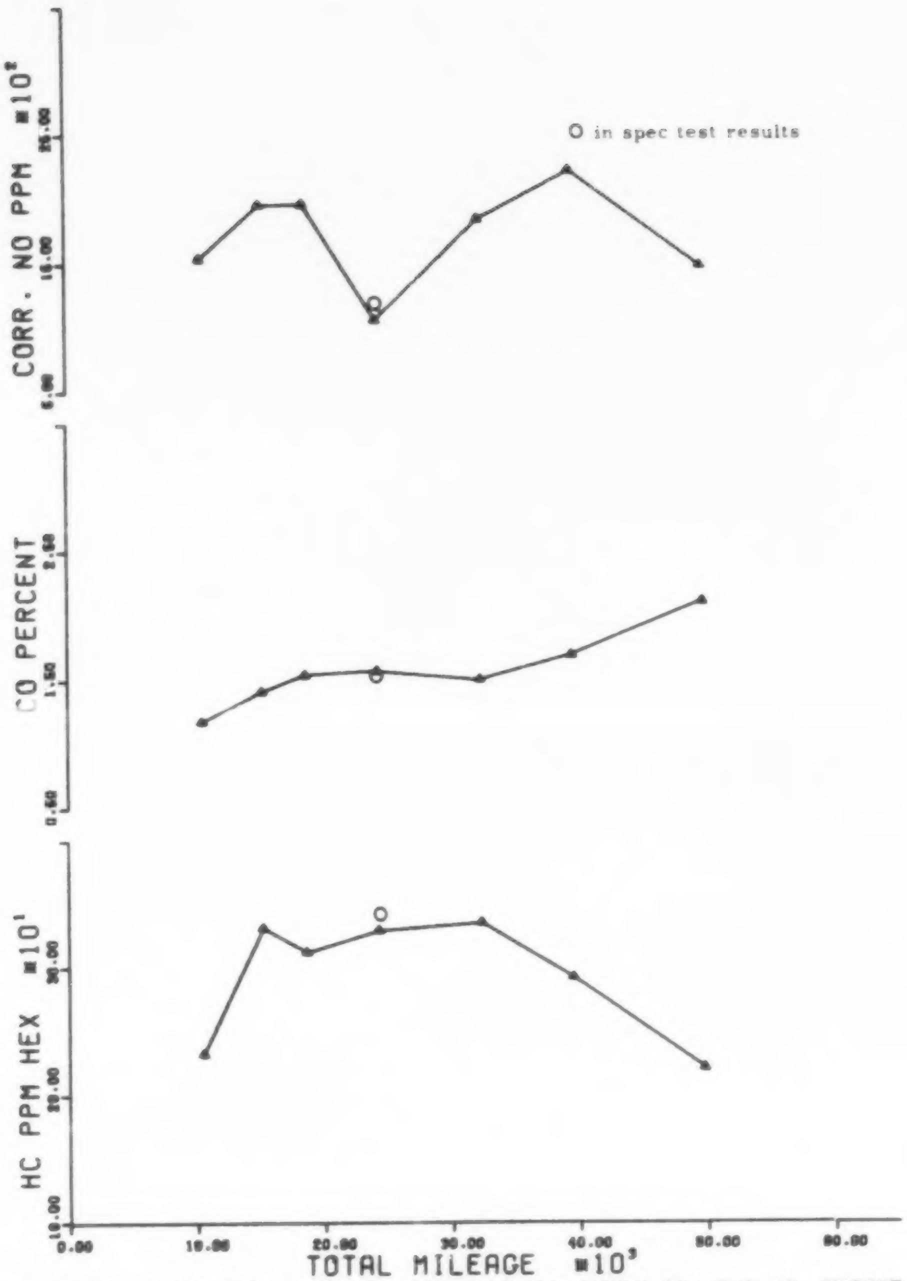


FIGURE E-83 UNIT 063 70 FORD 22000 LB GVW FRGHT 361 CID V8 ENGINE

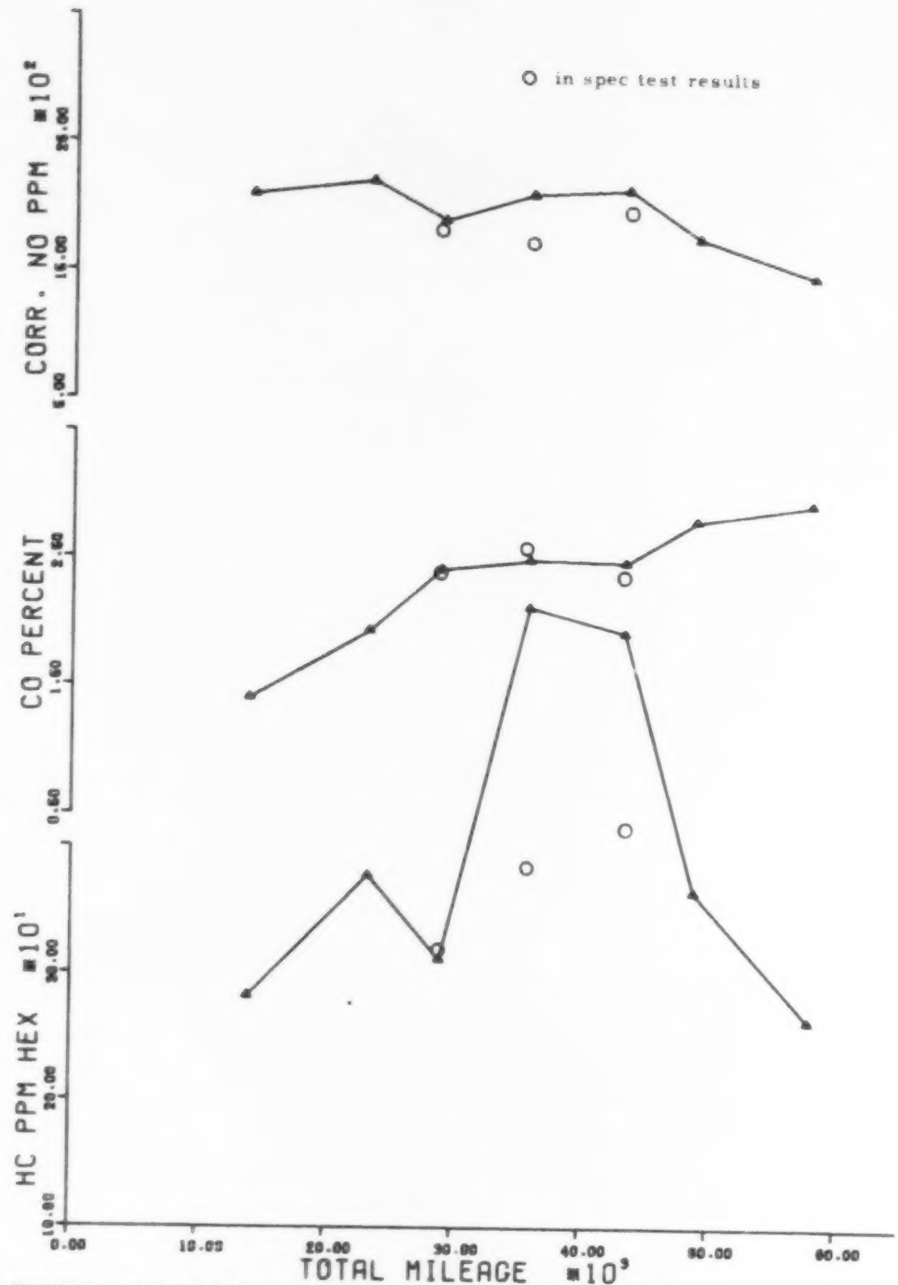


FIGURE E-84 UNIT 084 70 FORD 22000 LB GVW FRGHT 361 CID V8 ENGINE

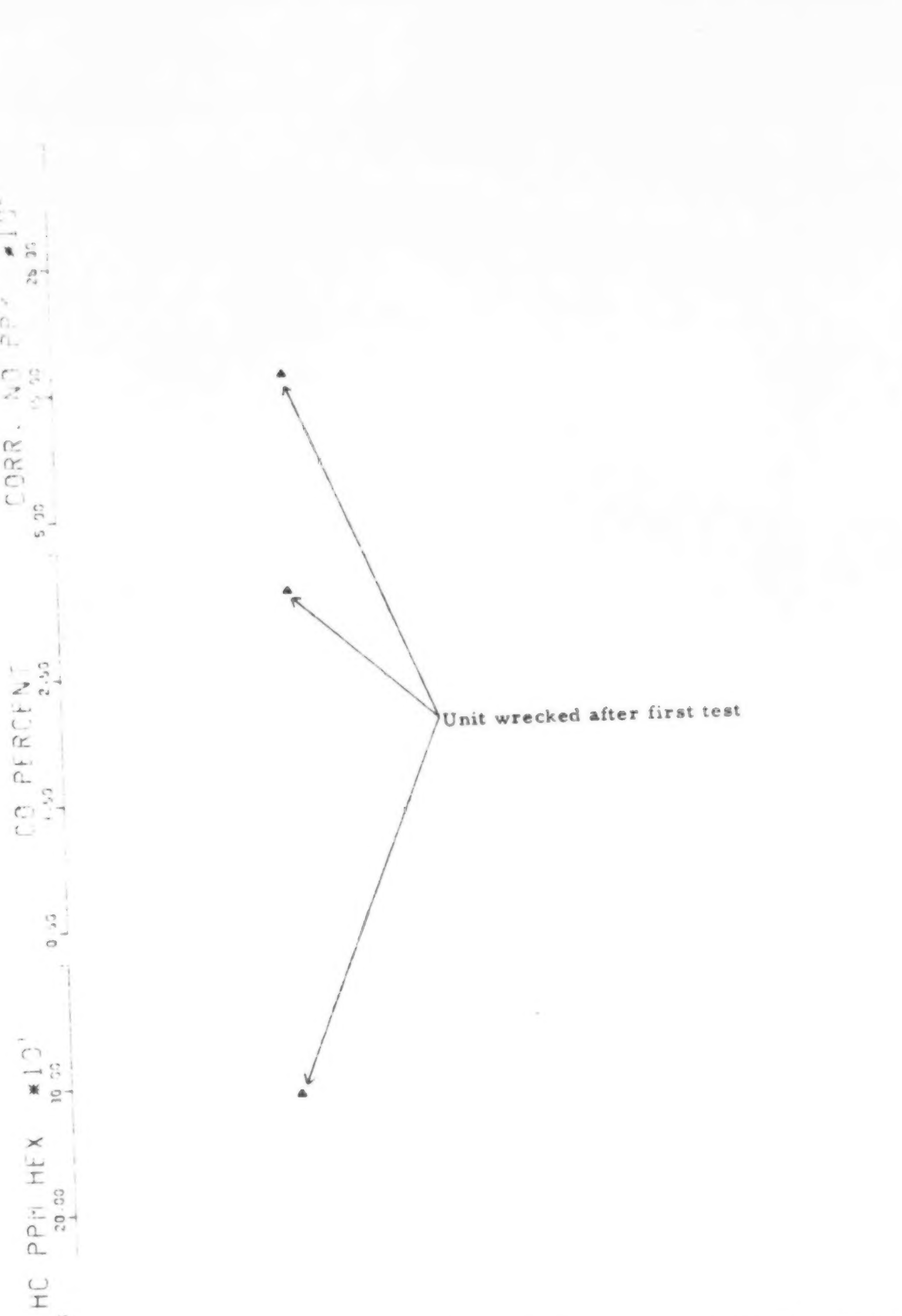


FIGURE E-85UNIT 085 70 CHEV 7500 LB GVW SERVICE 307 CID V8 ENGINE

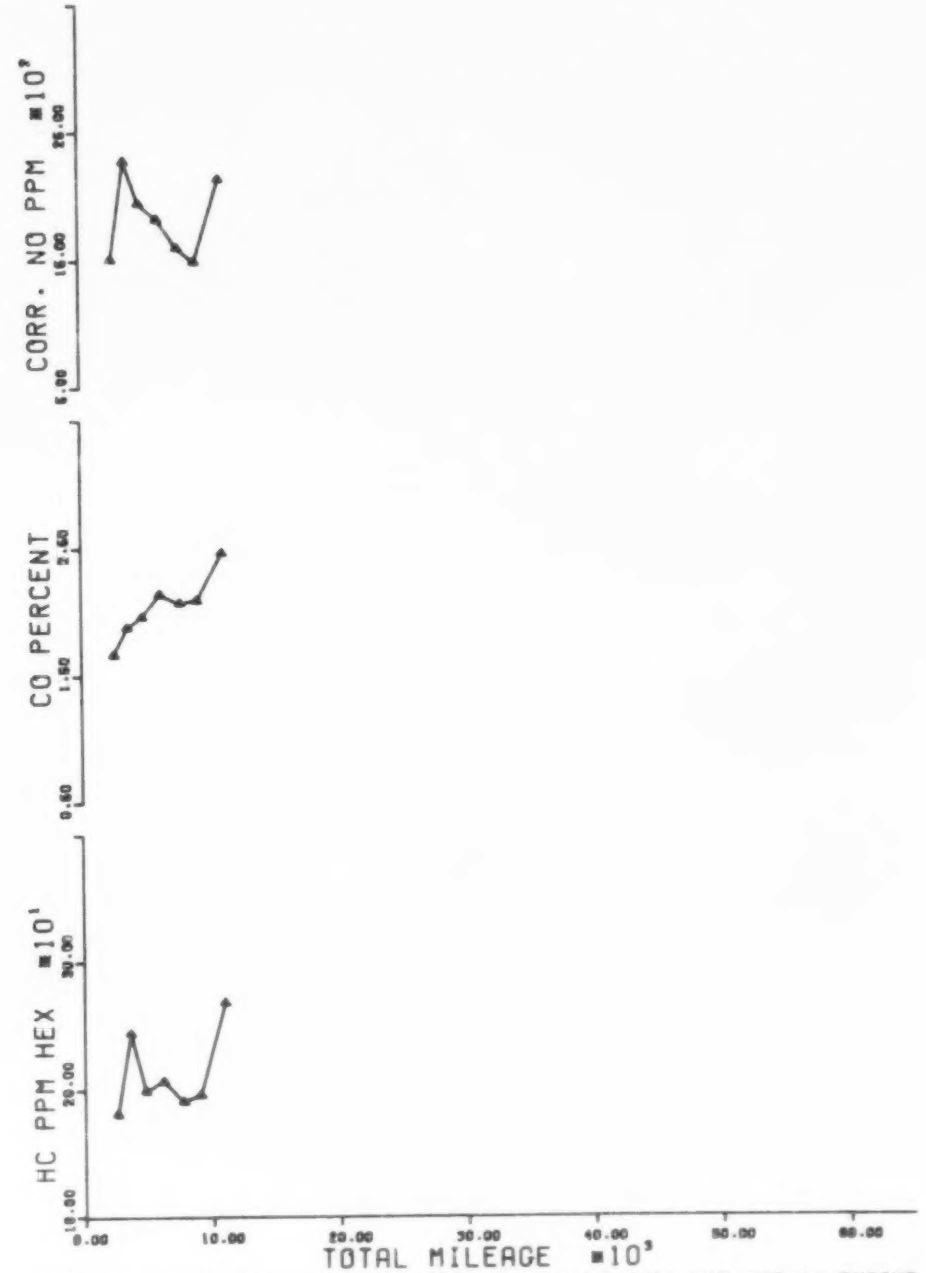


FIGURE E-86 UNIT 086 70 DODGE 10000 LB GVW LAUNDRY 225 CID I6 ENGINE

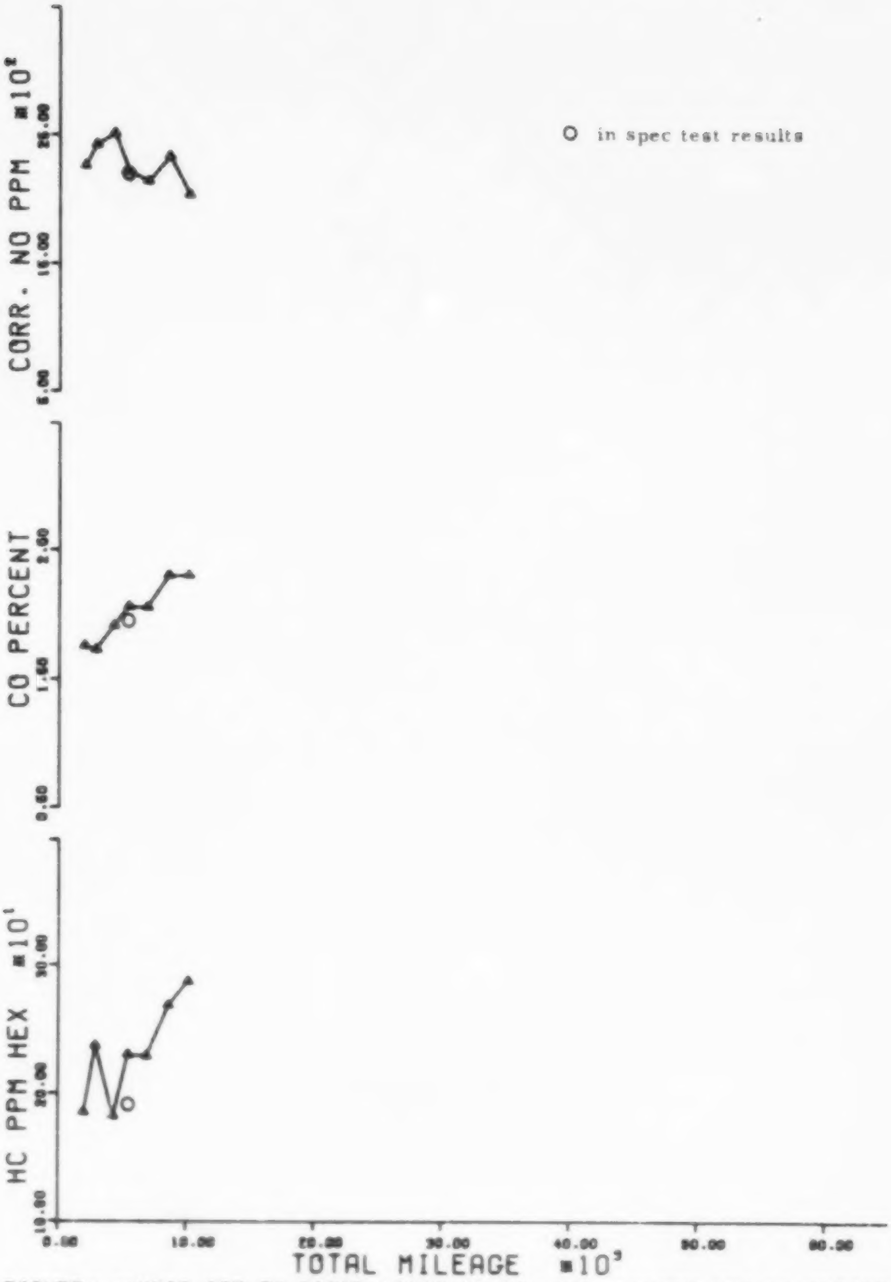
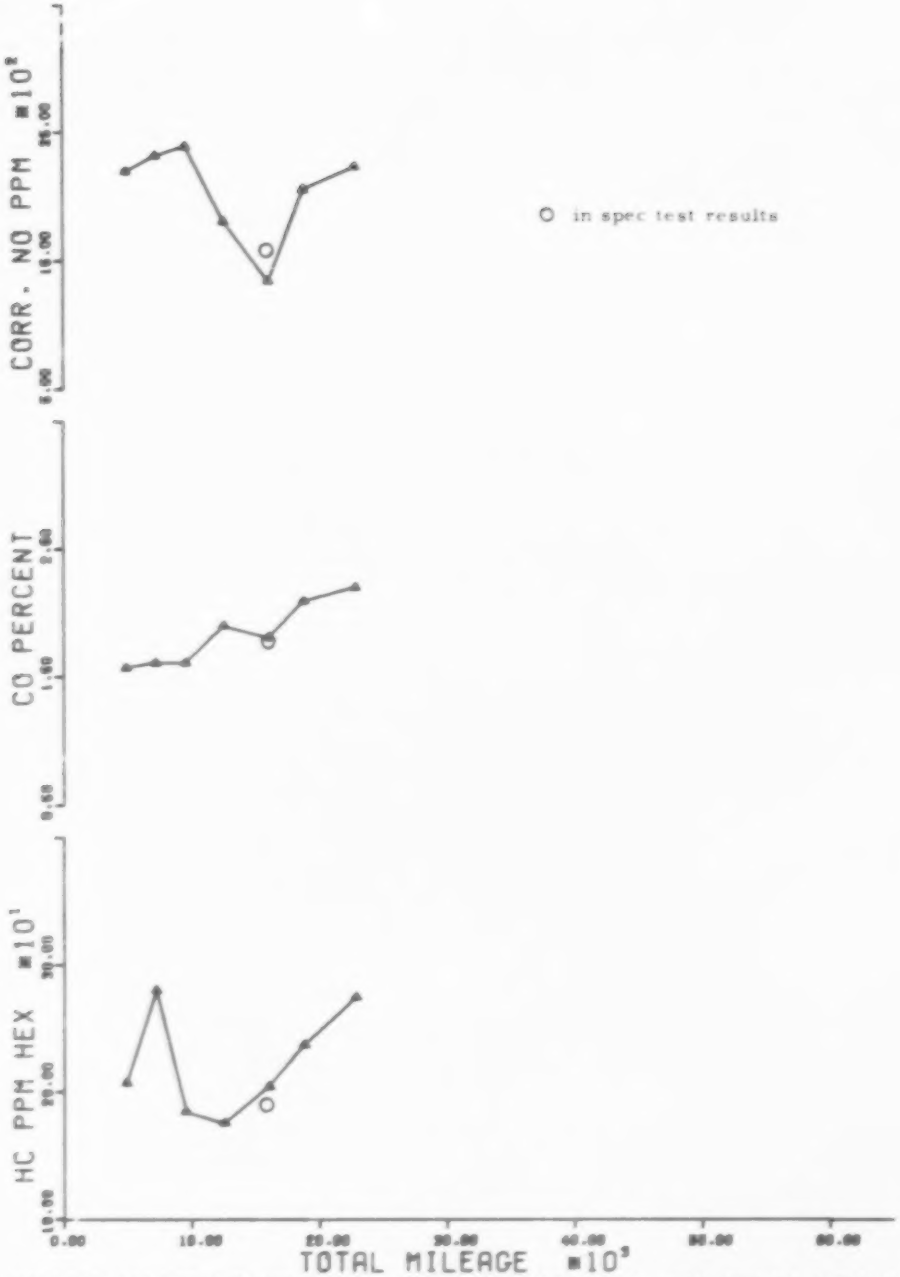


FIGURE E-87 UNIT 087 70 DODGE 10000 LB GVW GROUNDS 225 CID I6 ENGINE



FIGUREE-88 UNIT 088 70 DODGE 7500 LB GVW SERVICE 225 CID I6 ENGINE

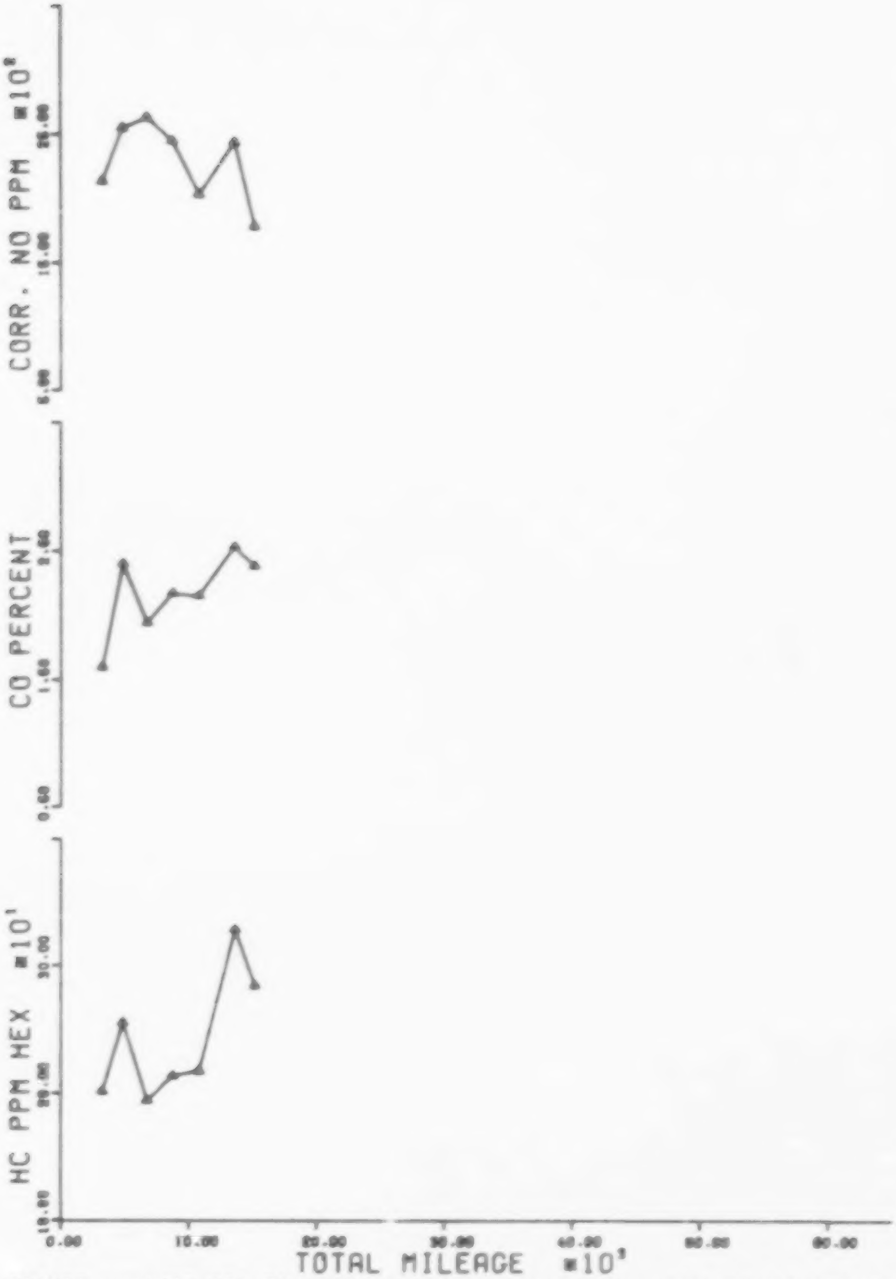


FIGURE E-89 UNIT 089 70 DODGE 10000 LB GVW MAINT. 225 CID I6 ENGINE

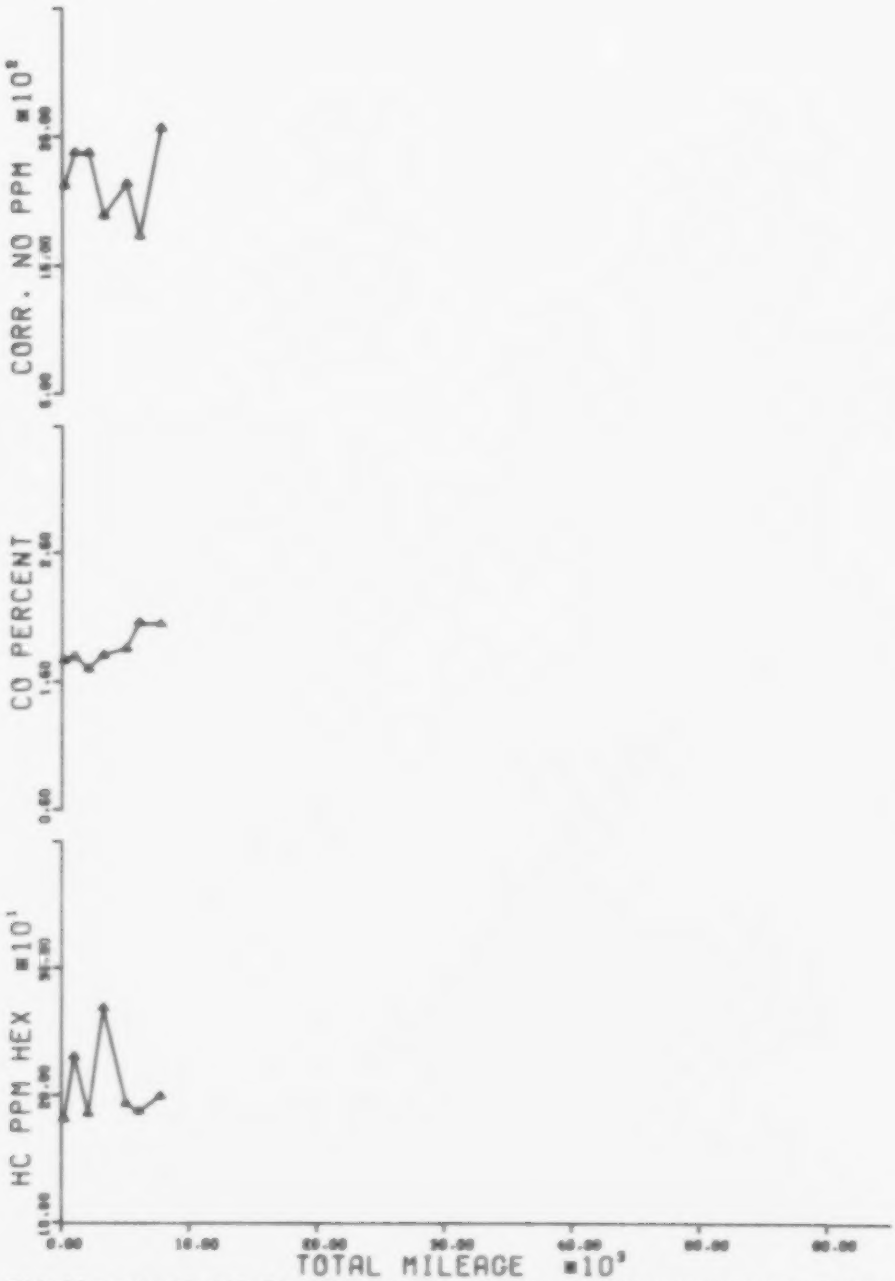


FIGURE E-90 UNIT 090 70 DODGE 10000 LB GVW GROUNDS 225 CID I6 ENGINE

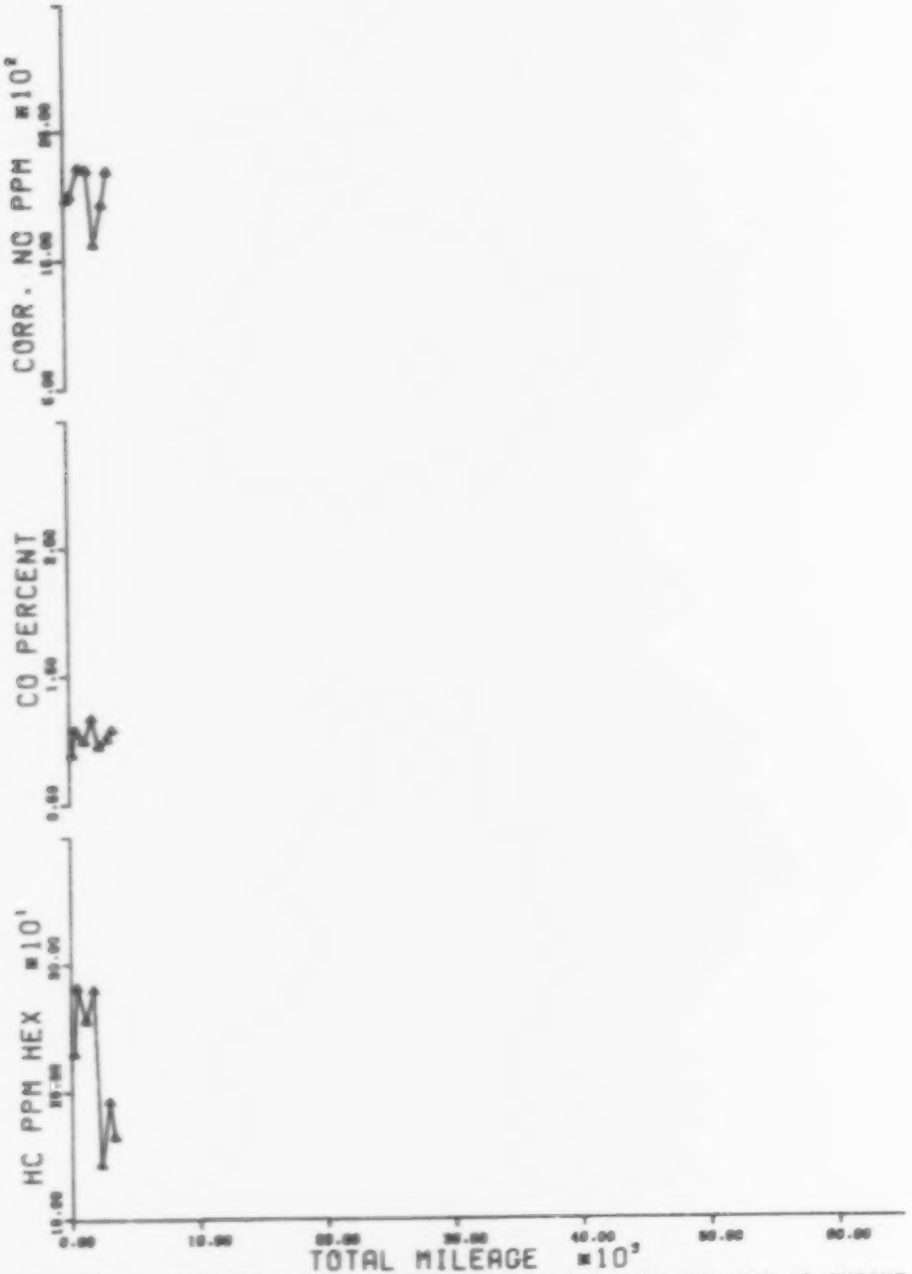


FIGURE E-91 UNIT 081 70 IHC 19000 LB GVW WATER TR 345 CID V8 ENGINE

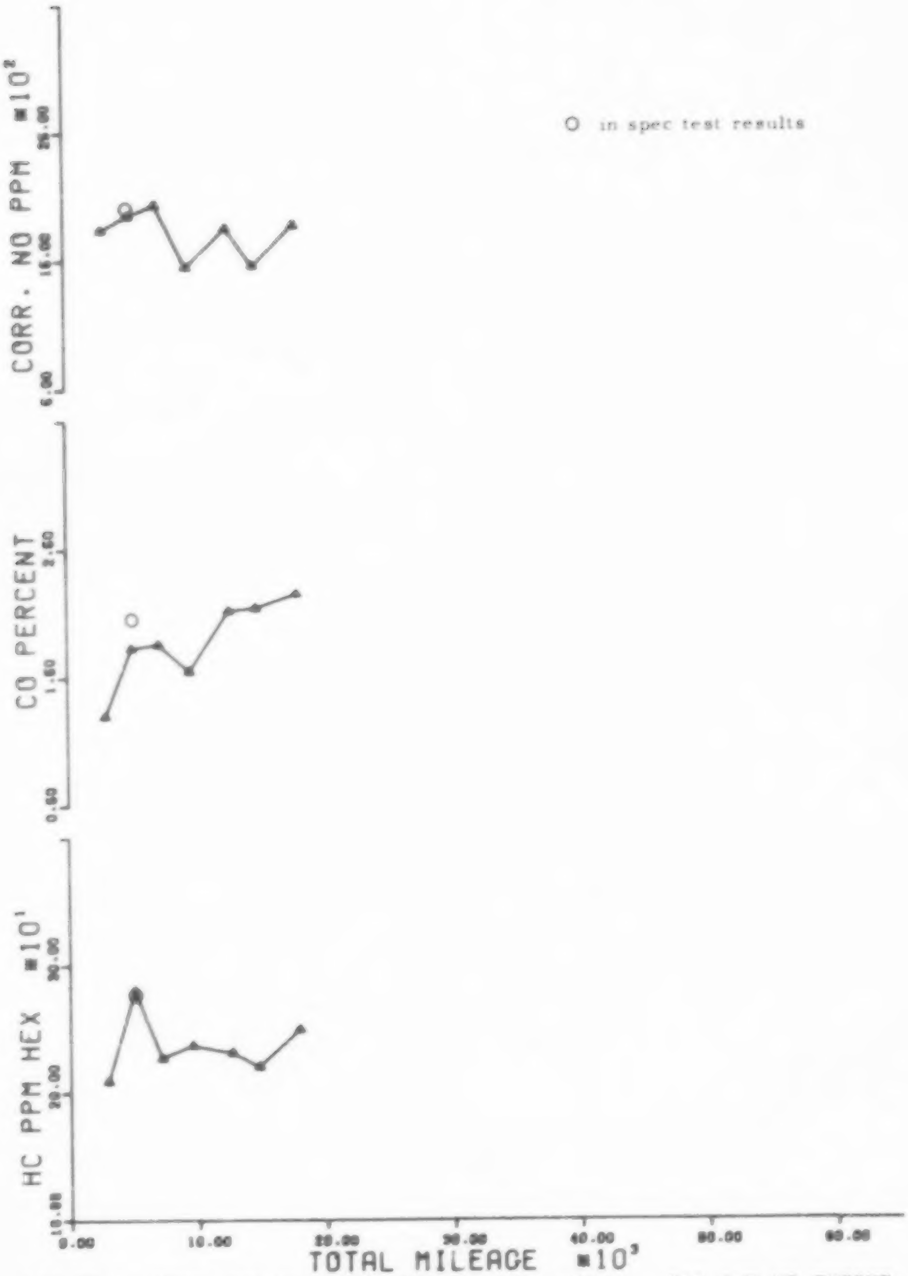


FIGURE E-92 UNIT 092 70 FORD 8300 LB GVW MAINT. 360 CID V8 ENGINE

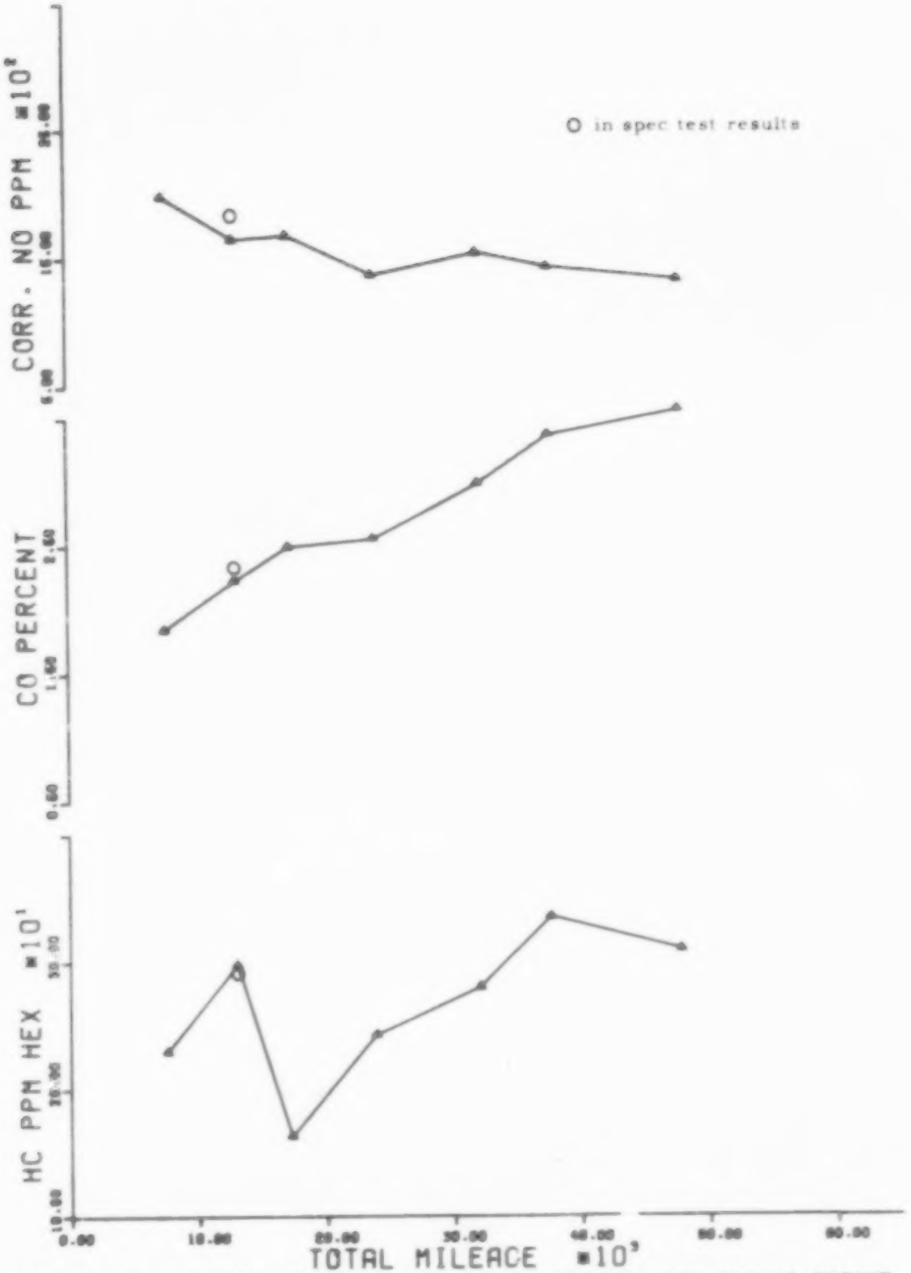


FIGURE E-93 UNIT 093 70 FORD 7500 LB GVW REPAIR 360 CID V8 ENGINE

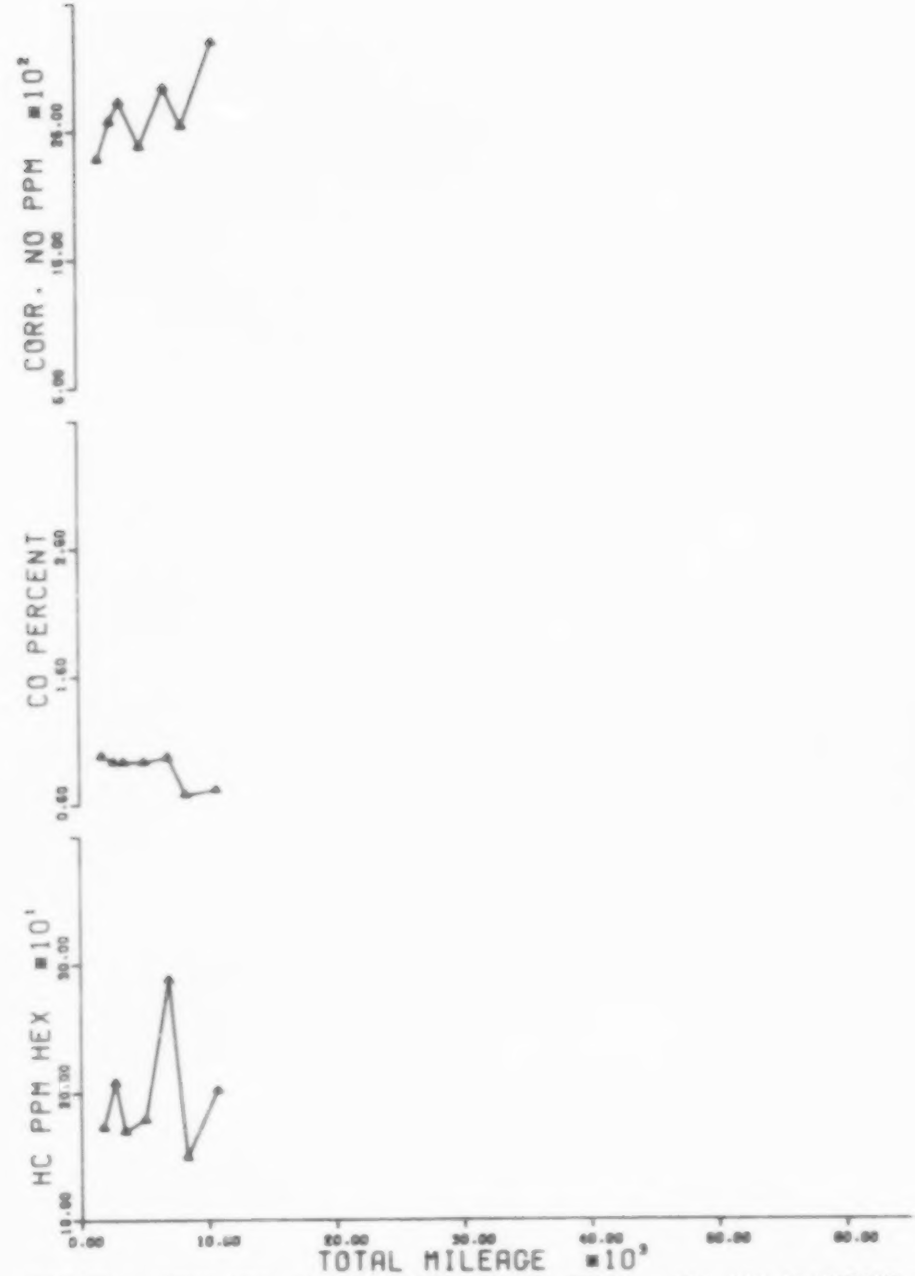


FIGURE E-94 UNIT 094 70 CHEV 14000 LB GVW MAINT. 292 CID I6 ENGINE

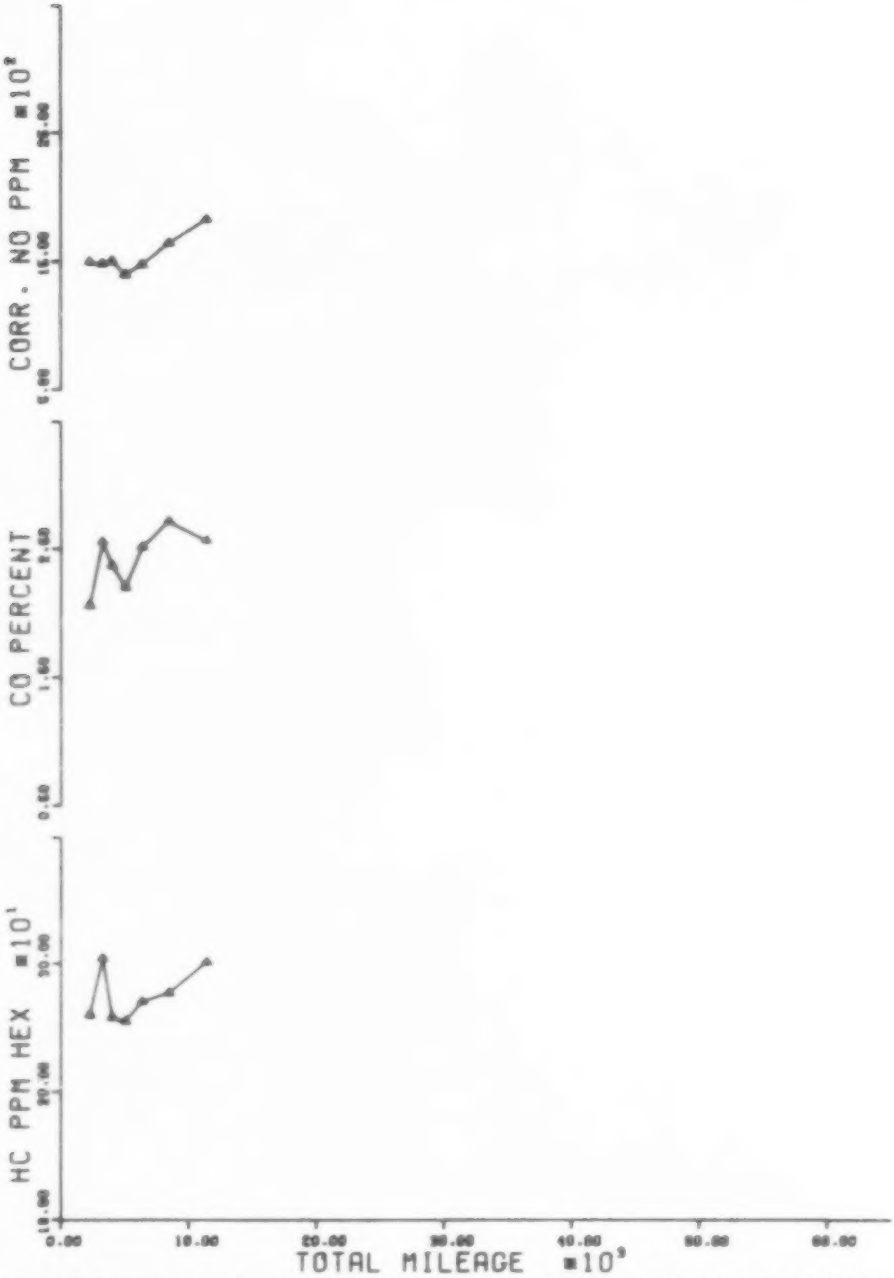


FIGURE E-95 UNIT 095 70 FORD 8300 LB GVW MAINT. 360 CID V8 ENGINE

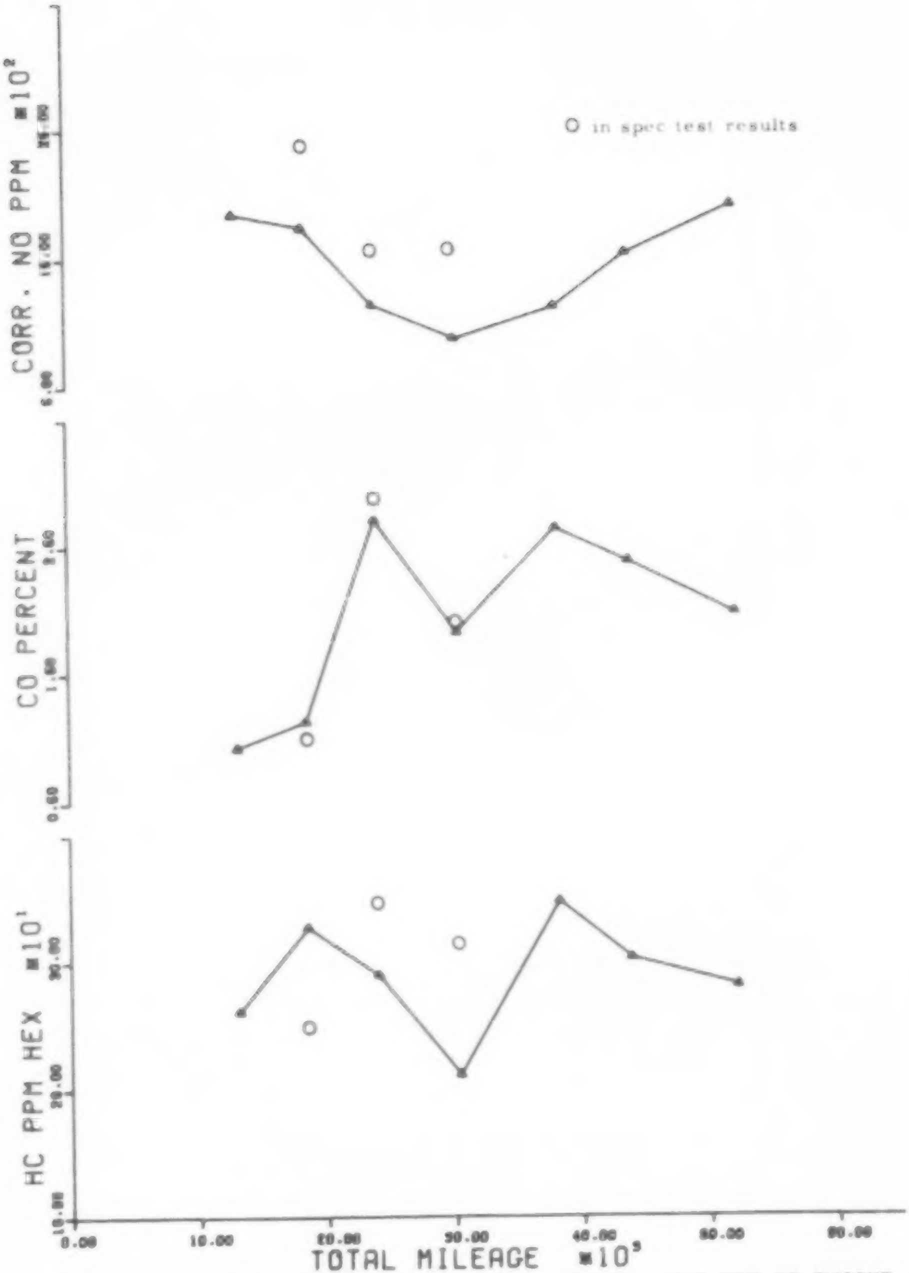


FIGURE E-96 UNIT 096 70 FORD 7500 LB GVW MAINT. 240 CID I6 ENGINE

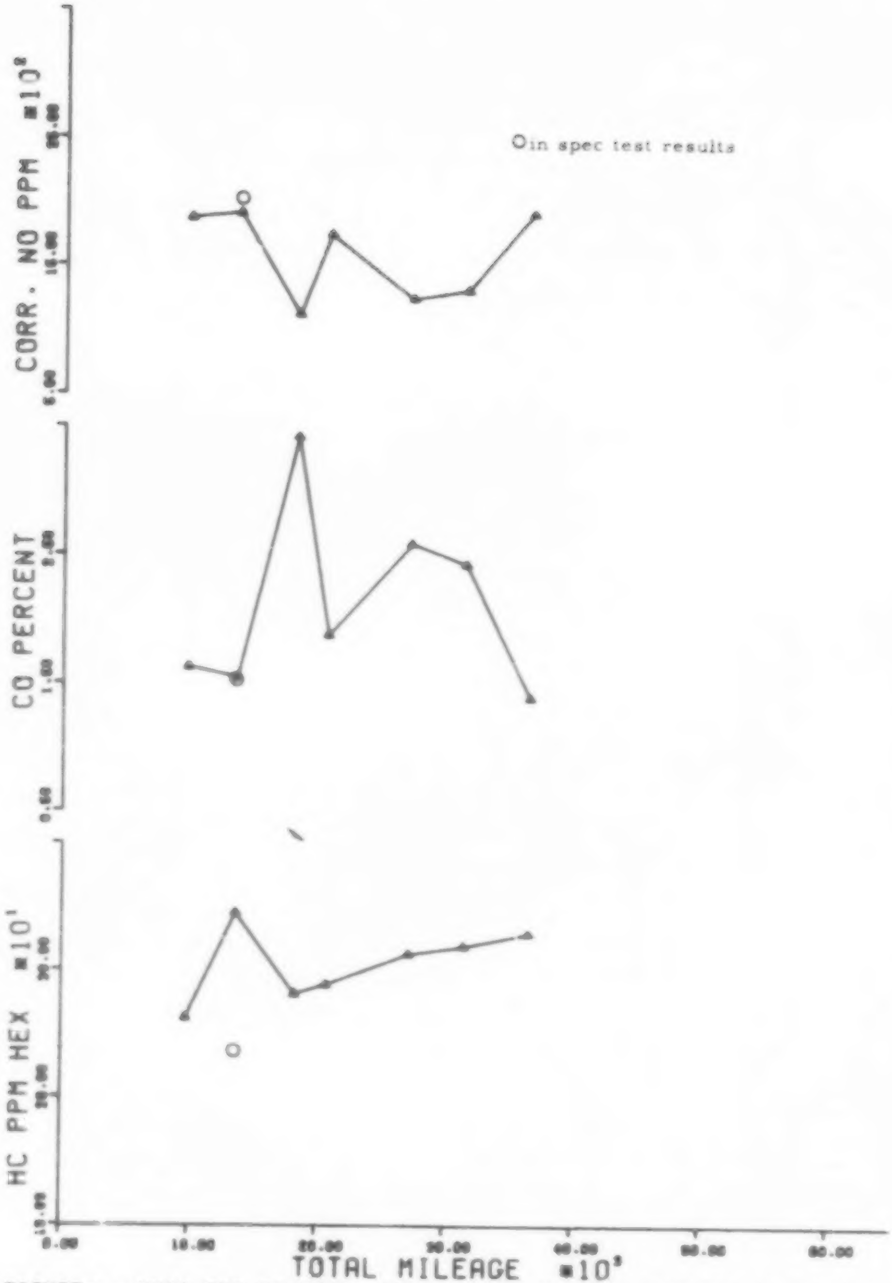


FIGURE E-97 UNIT 097 70 FORD 7500 LB GVW WELDER 240 CID I6 ENGINE

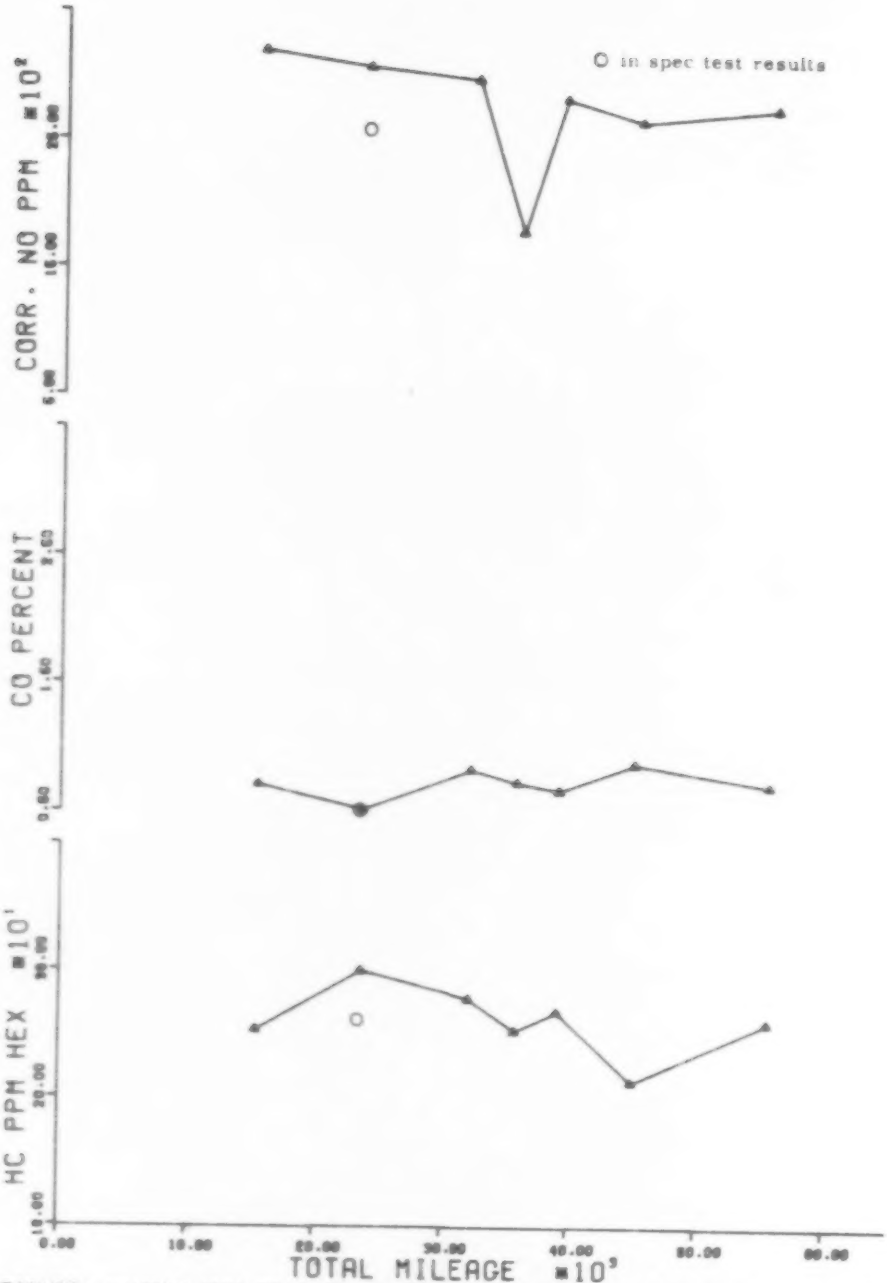


FIGURE E-98 UNIT 098 70 FORD 21000 LB GVW WATER TR 330 CID V8 ENGINE

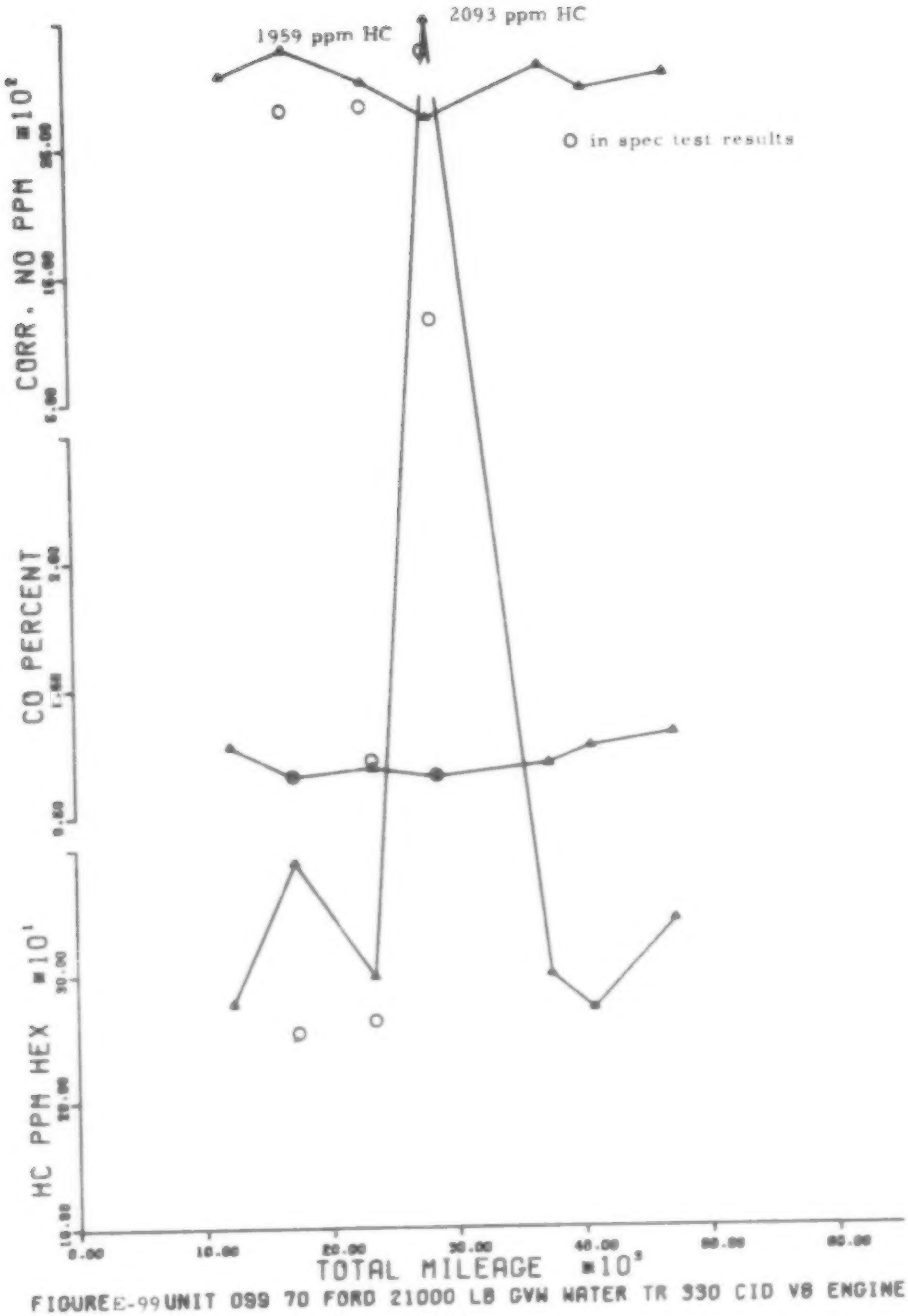


FIGURE E-99 UNIT 099 70 FORD 21000 LB GVW WATER TR 330 CID V8 ENGINE

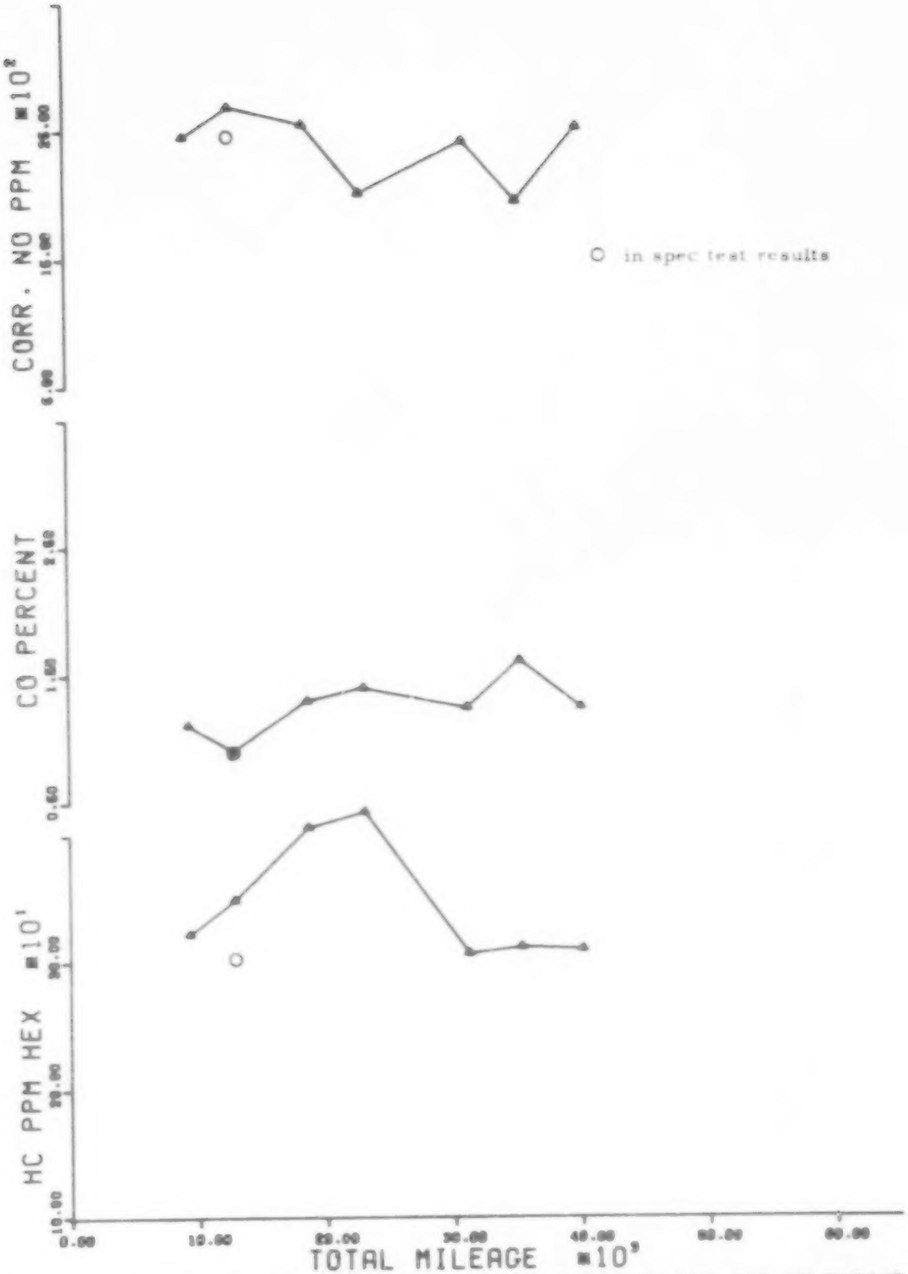


FIGURE E-100. UNIT 100 70 FORD 21000 LB GVW WATER TR 330 CID V8 ENGINE

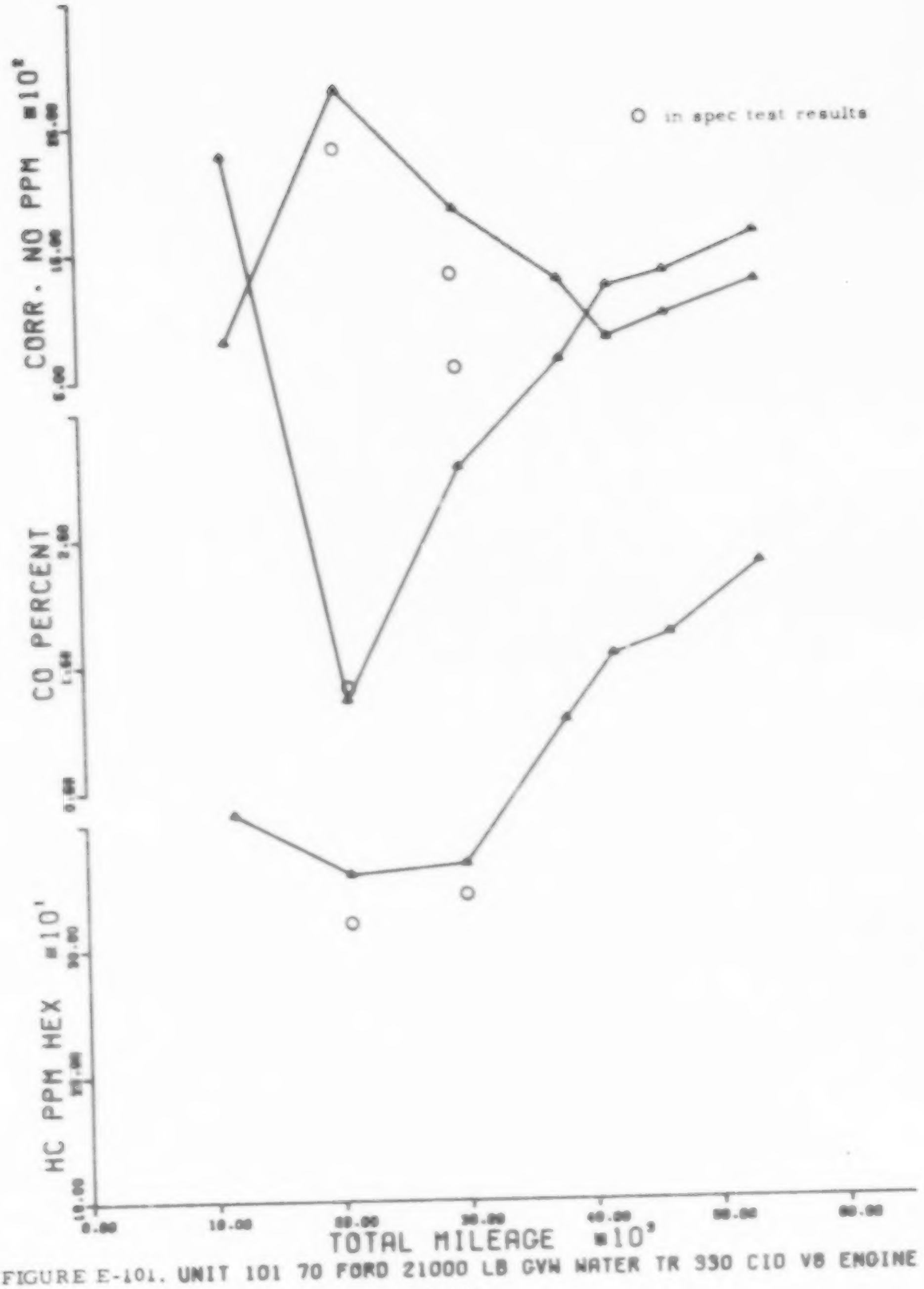


FIGURE E-101. UNIT 101 70 FORD 21000 LB GVW WATER TR 330 CID V8 ENGINE

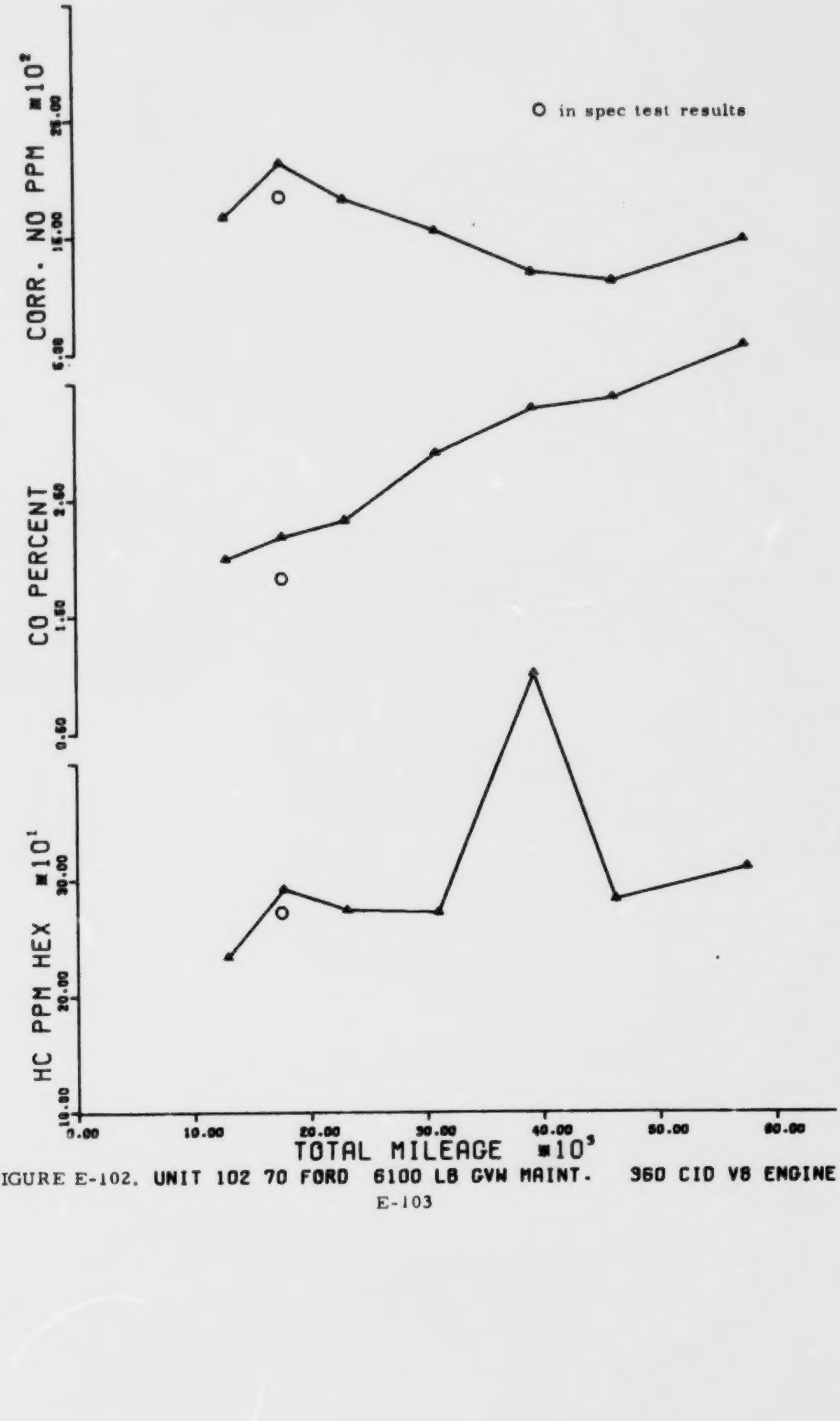


FIGURE E-102. UNIT 102 70 FORD 6100 LB GVW MAINT. 360 CID V8 ENGINE

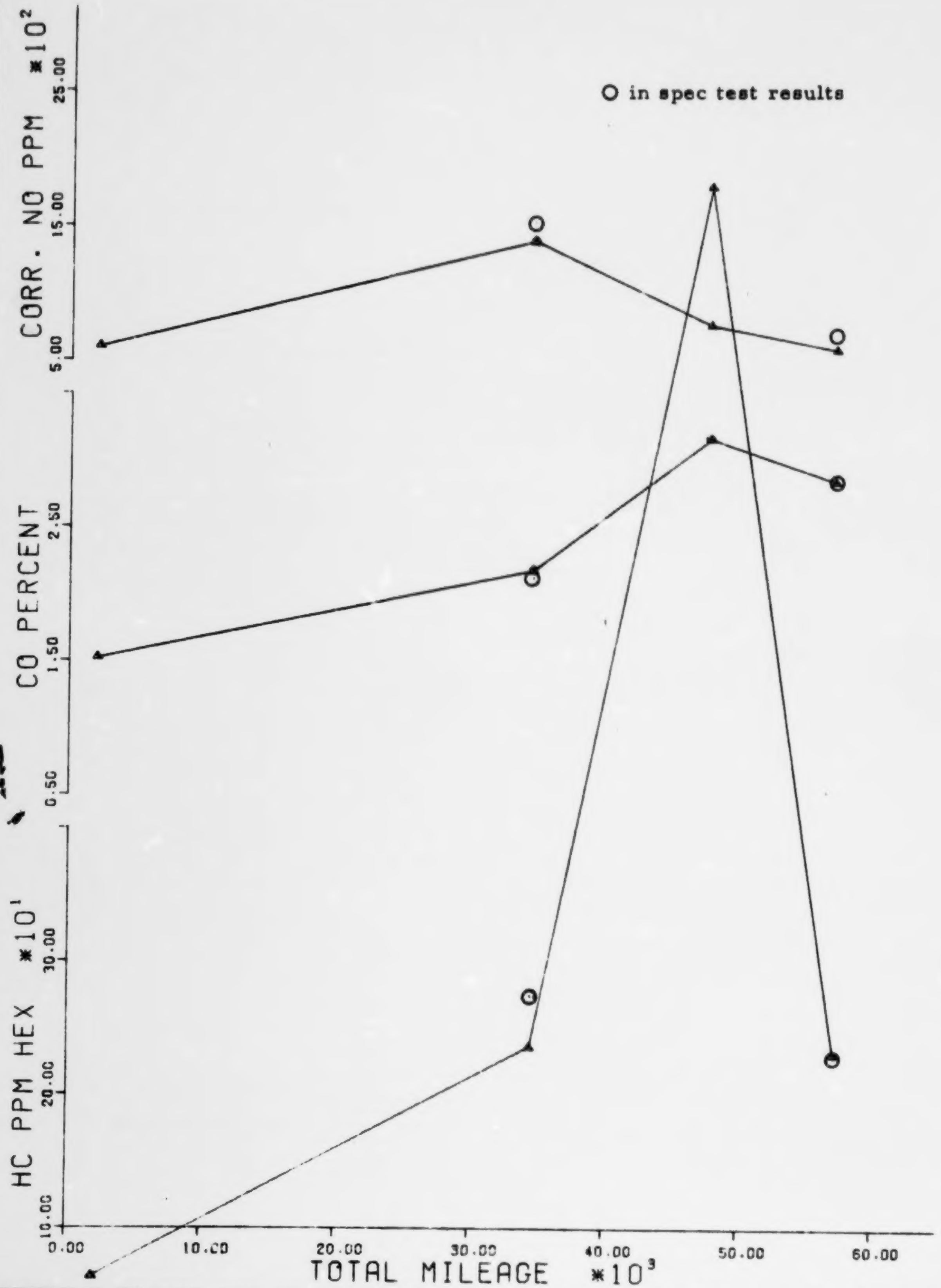


FIGURE E-103 UNIT 103 70 GMC 32500 LB GVW MOVING TR 427 CID V8 ENGINE

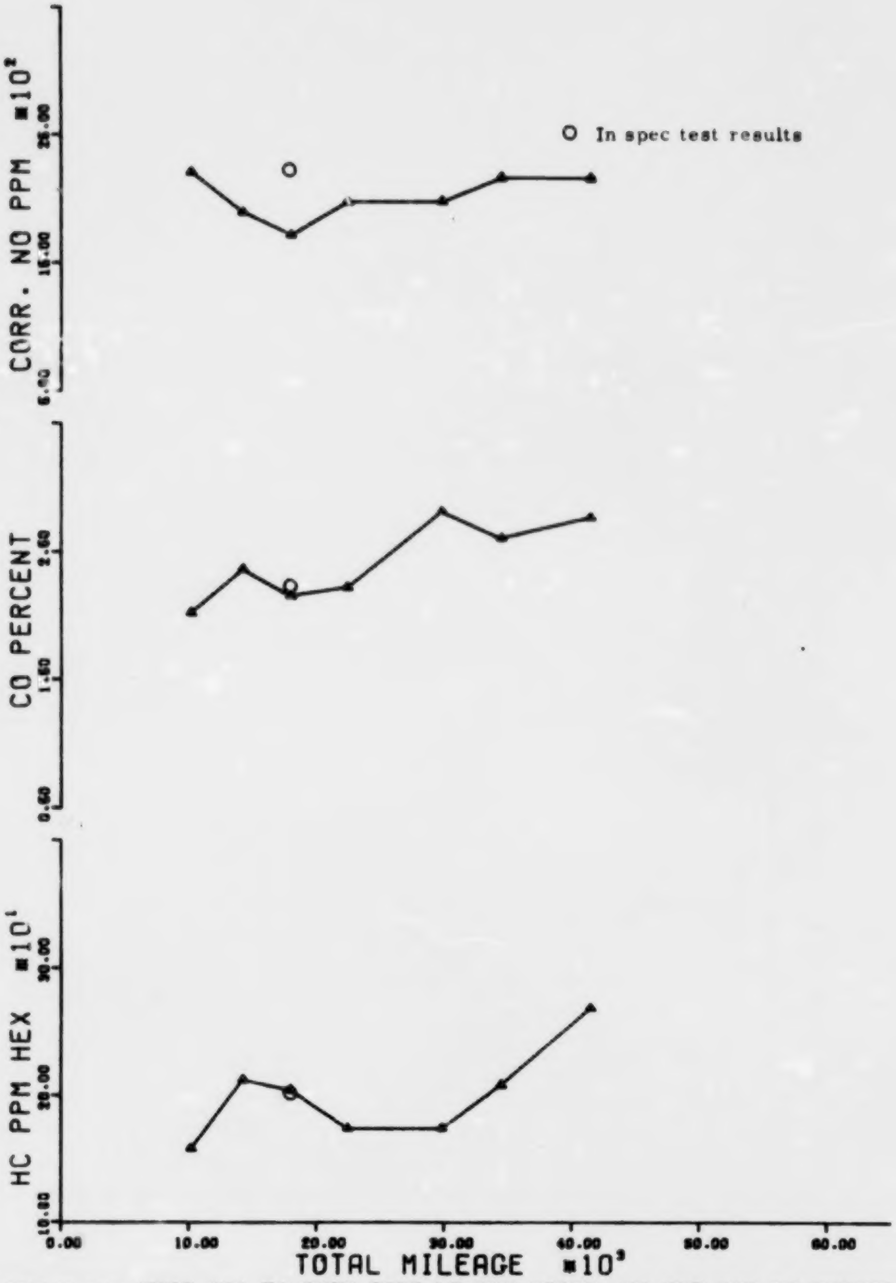


FIGURE E-104. UNIT 104 70 CHEV 7500 LB GVW MAINT. TR 307 CID V8 ENGINE

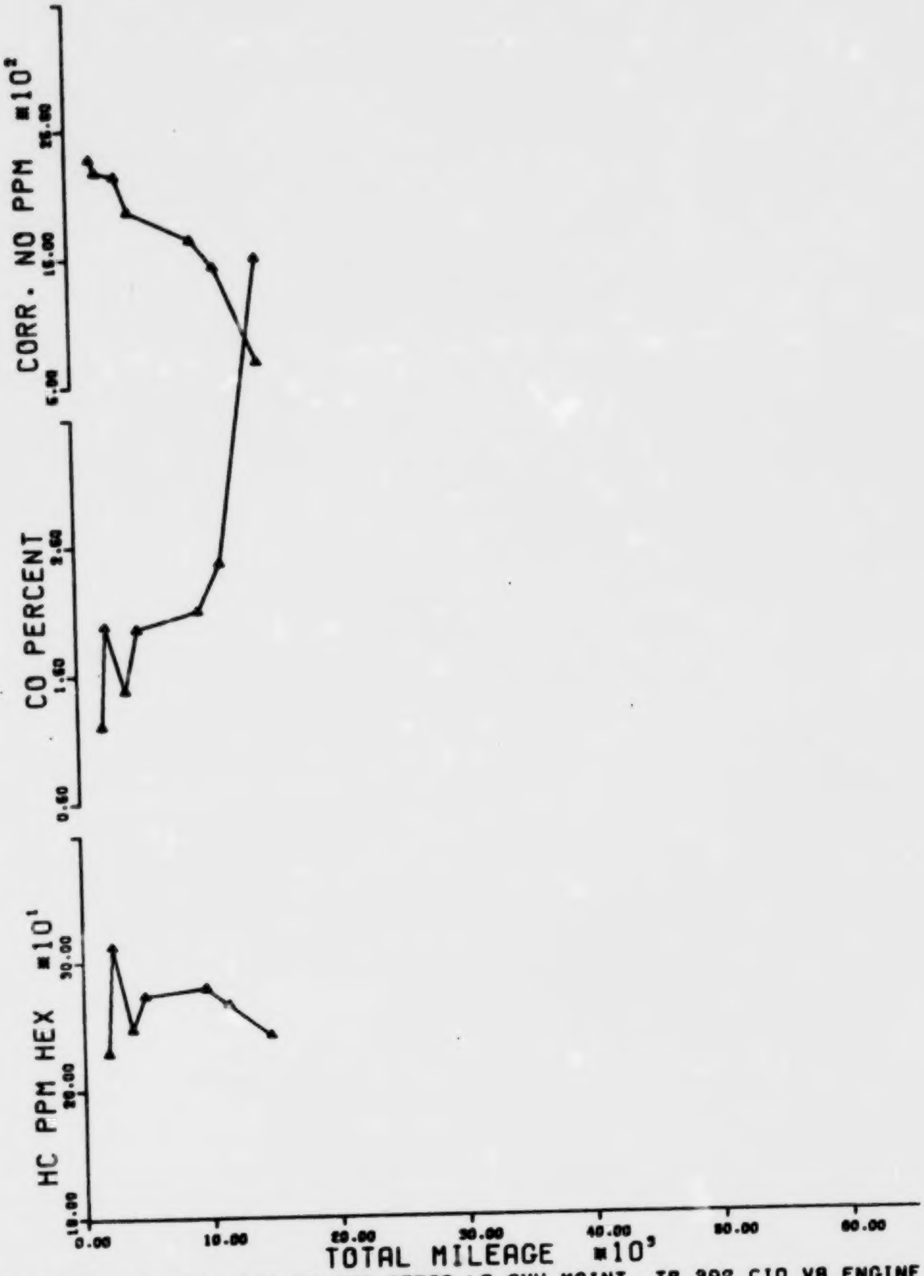


FIGURE E-105.UNIT 105 70 IHC 25500 LB GVW MAINT. TR 392 CID V8 ENGINE

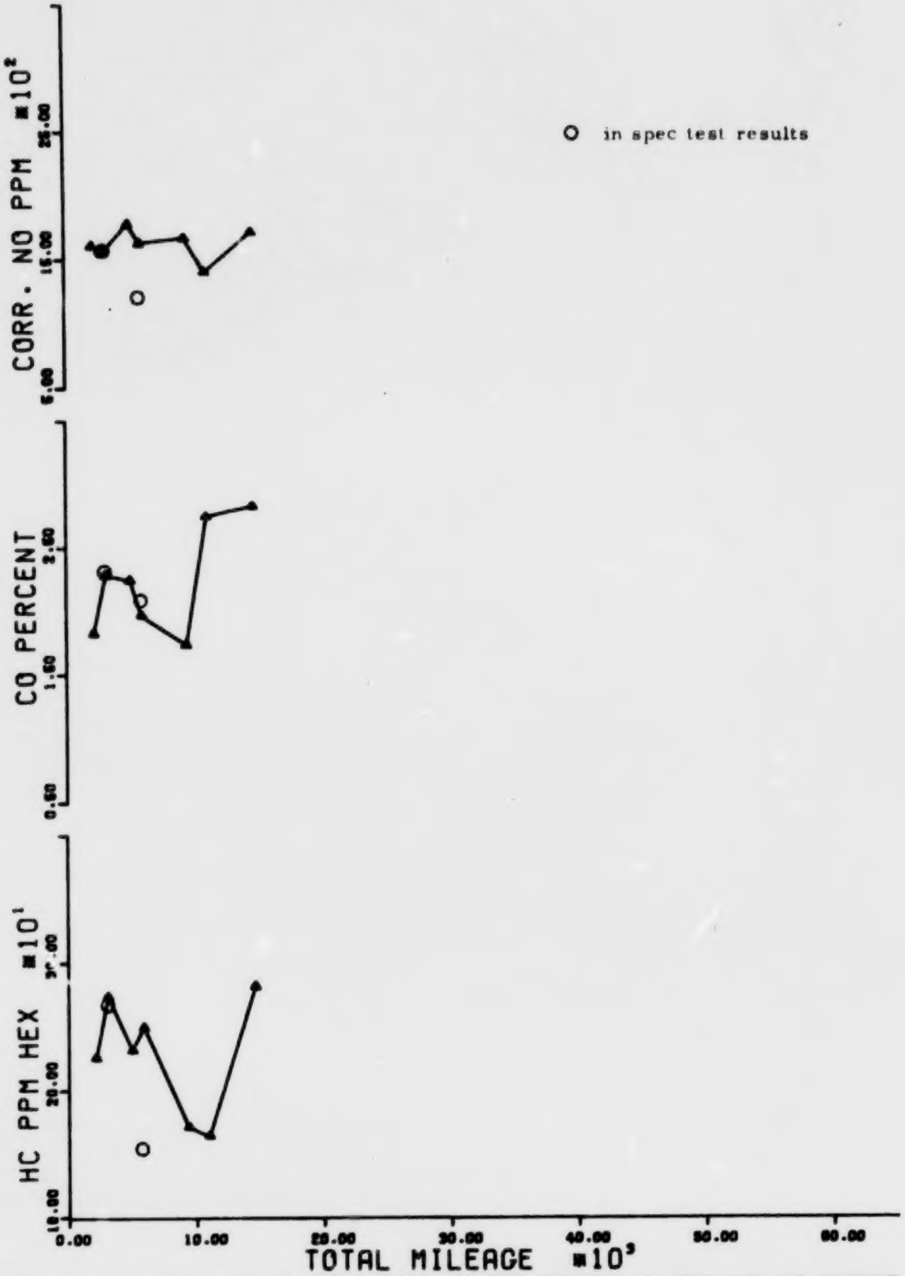


FIGURE E-106. UNIT 106 70 FORD 8300 LB GVW MAINT. TR 360 CID V8 ENGINE

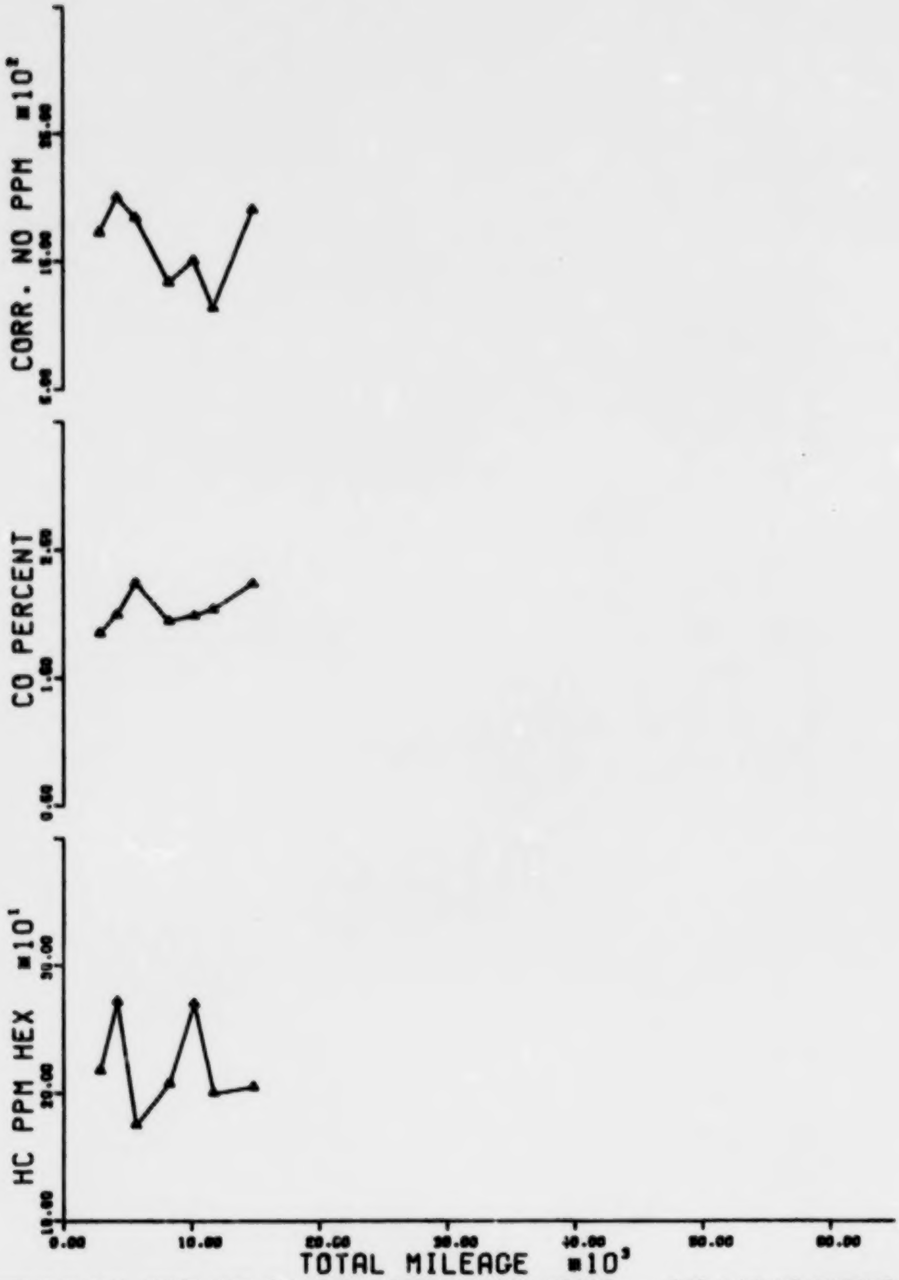


FIGURE E-107. UNIT 107 70 CHEV 7500 LB GVW MAINT. 307 CID V8 ENGINE

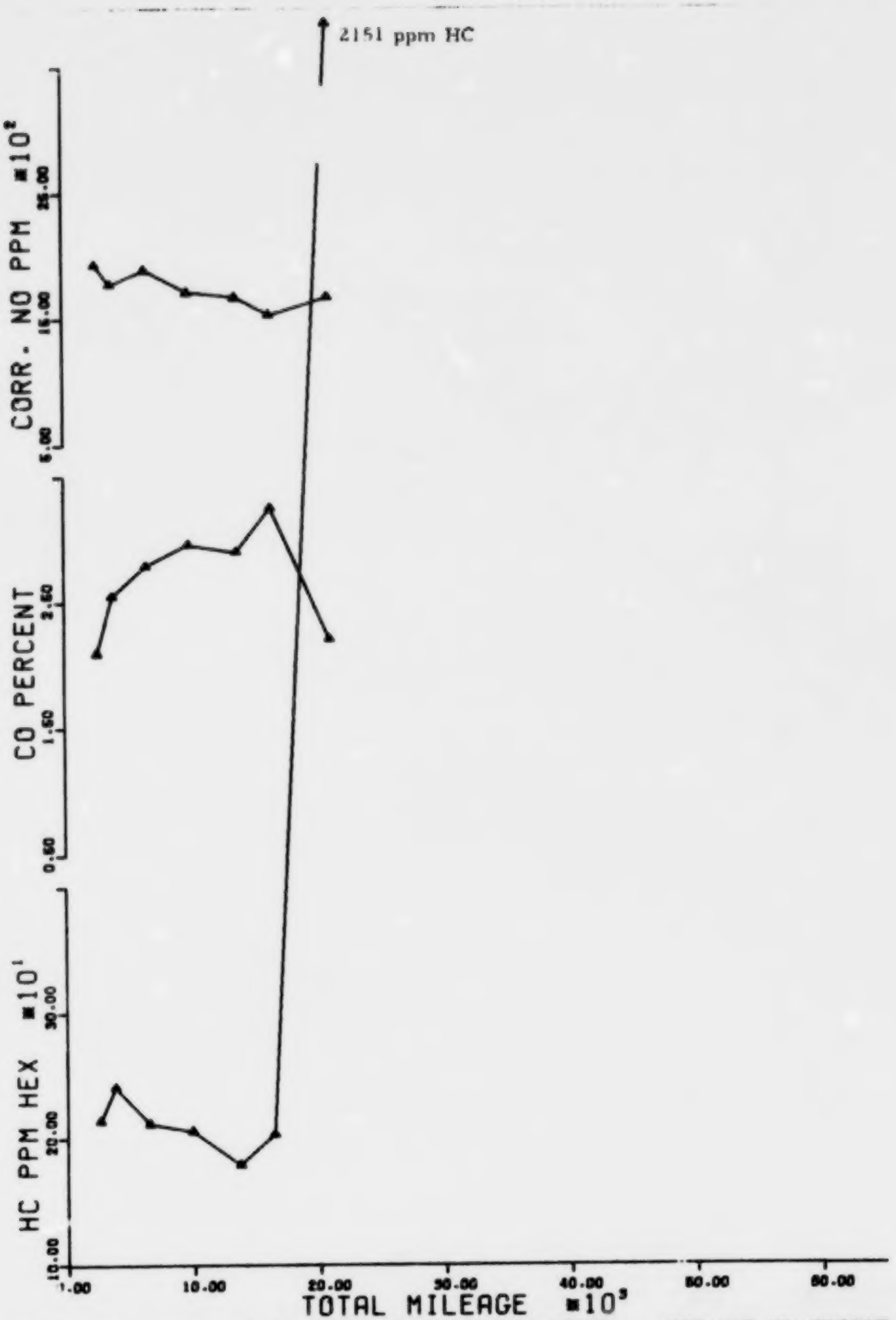


FIGURE E-108. UNIT 108 70 CHEV 10000 LB GVW MAINT. 307 CID V8 ENGINE

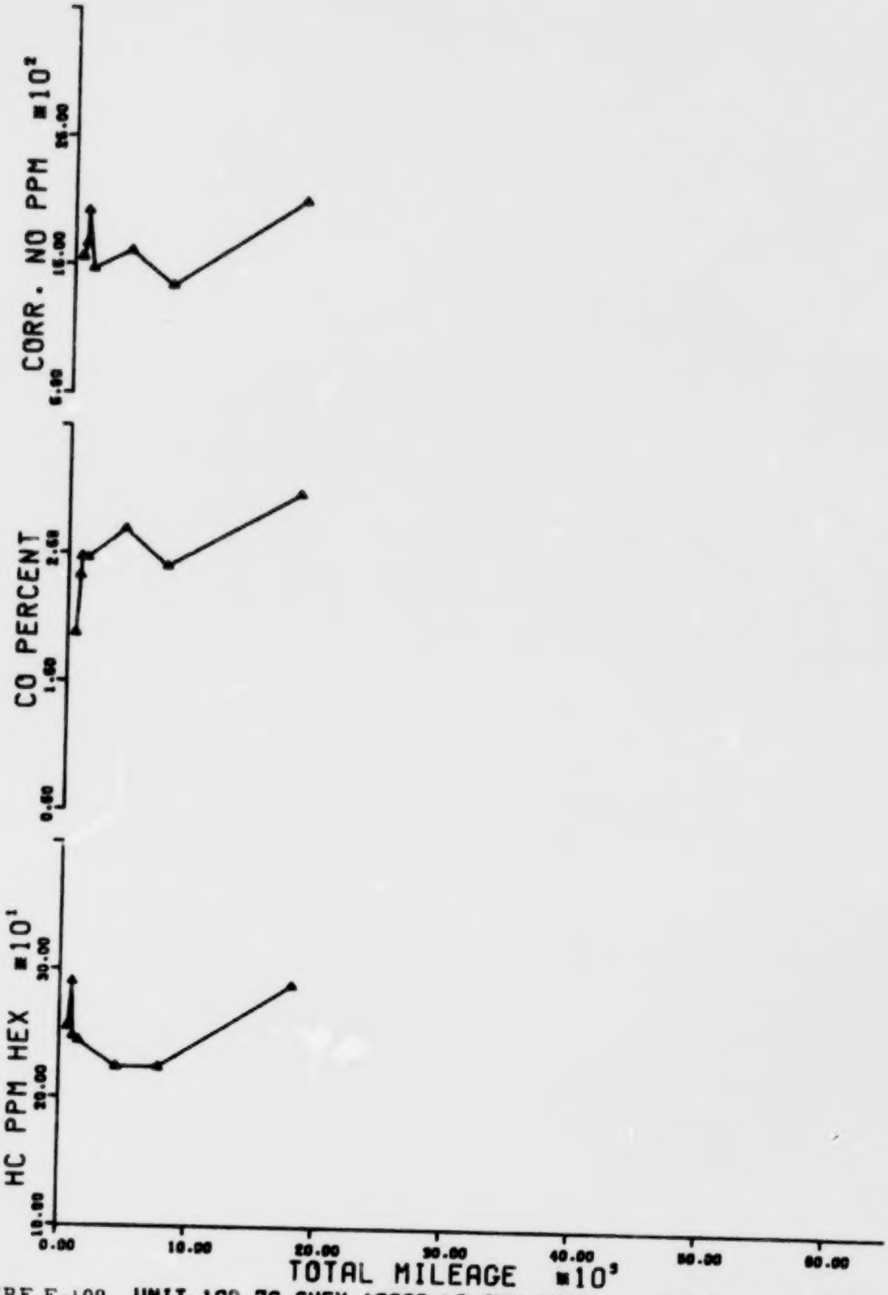


FIGURE E-109. UNIT 108 70 CHEV 10000 LB GVW MAINT. 307 CID V8 ENGINE

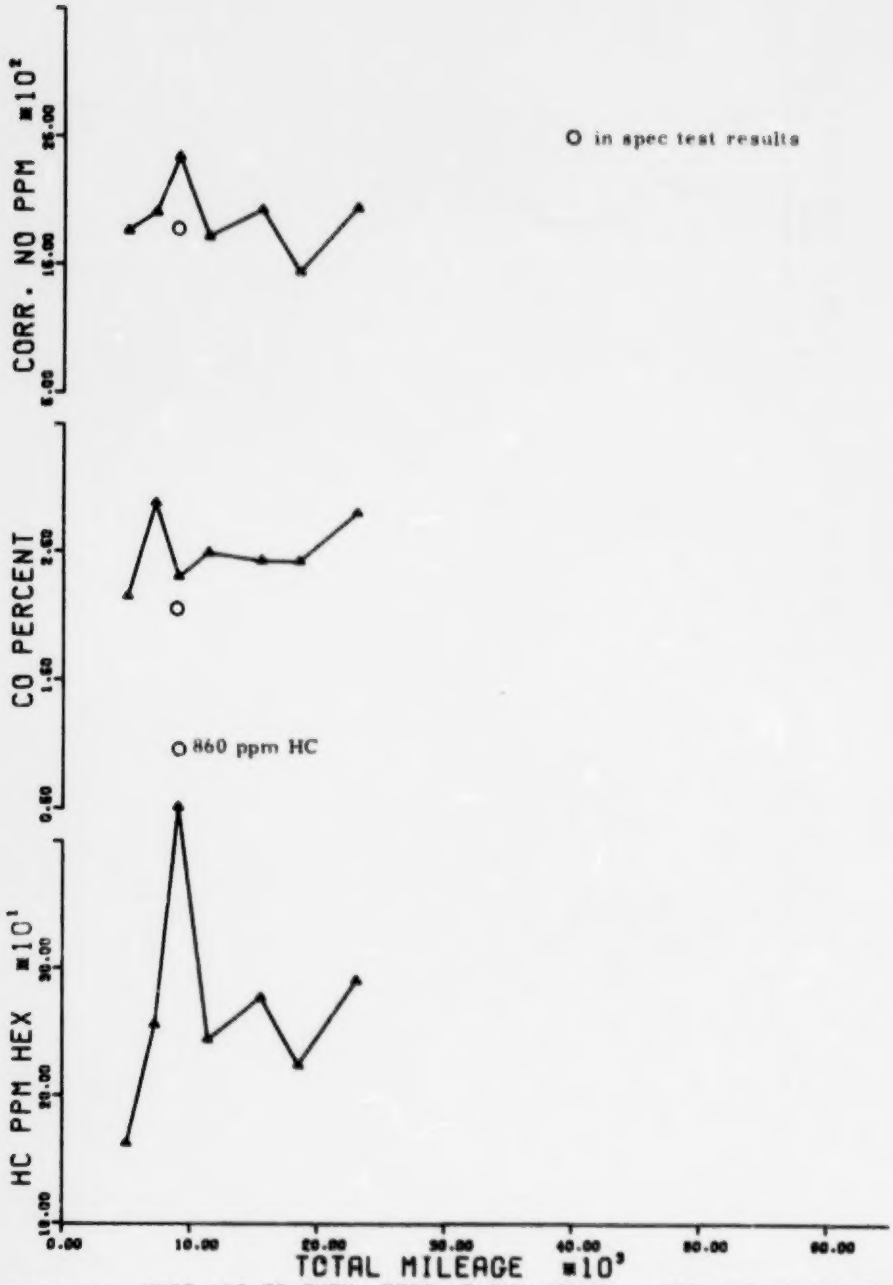


FIGURE E-110. UNIT 110 70 CHEV 7500 LB GVW MAINT. 307 CID V8 ENGINE

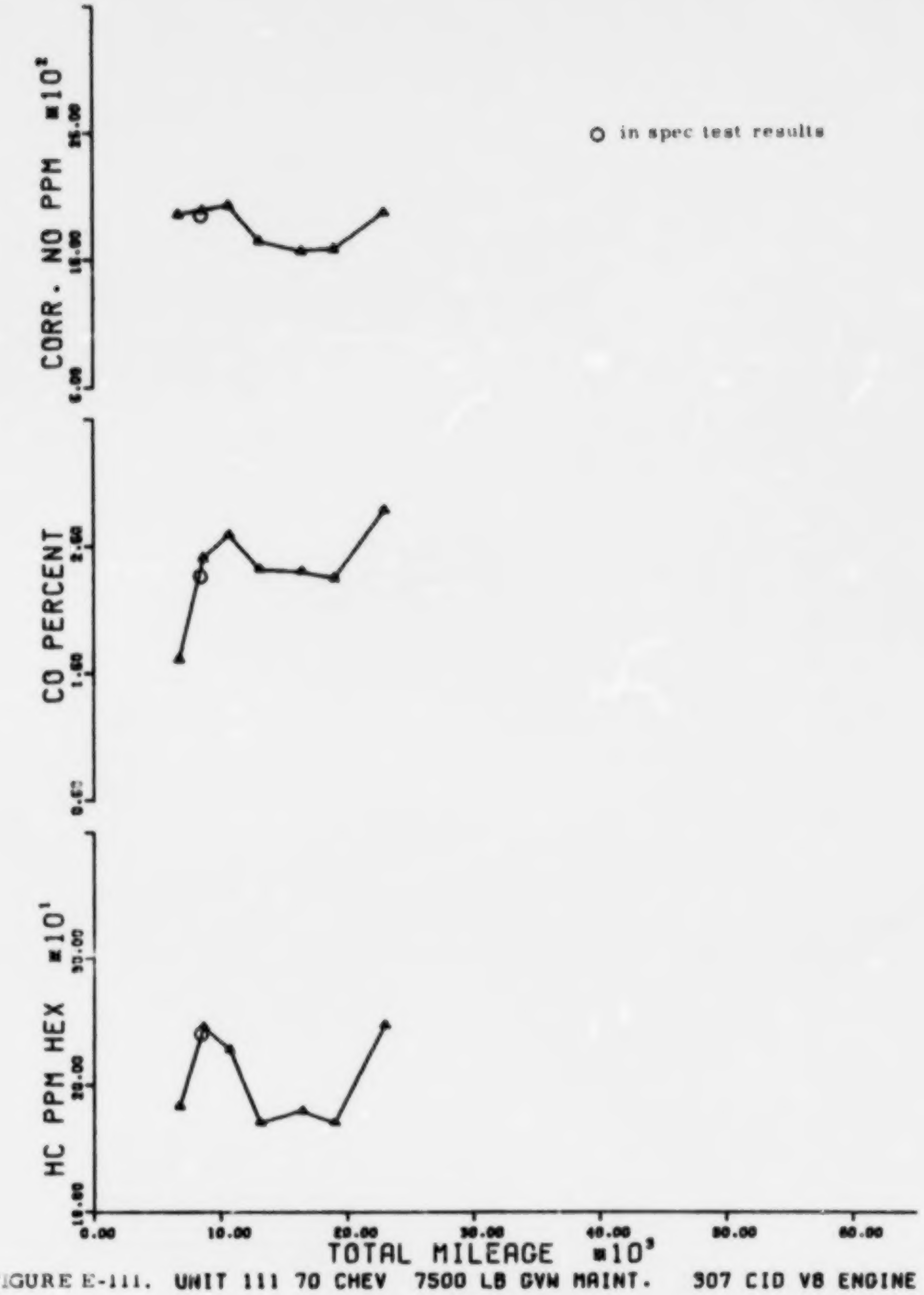


FIGURE E-111. UNIT 111 70 CHEV 7500 LB GVW MAINT. 307 CID V8 ENGINE

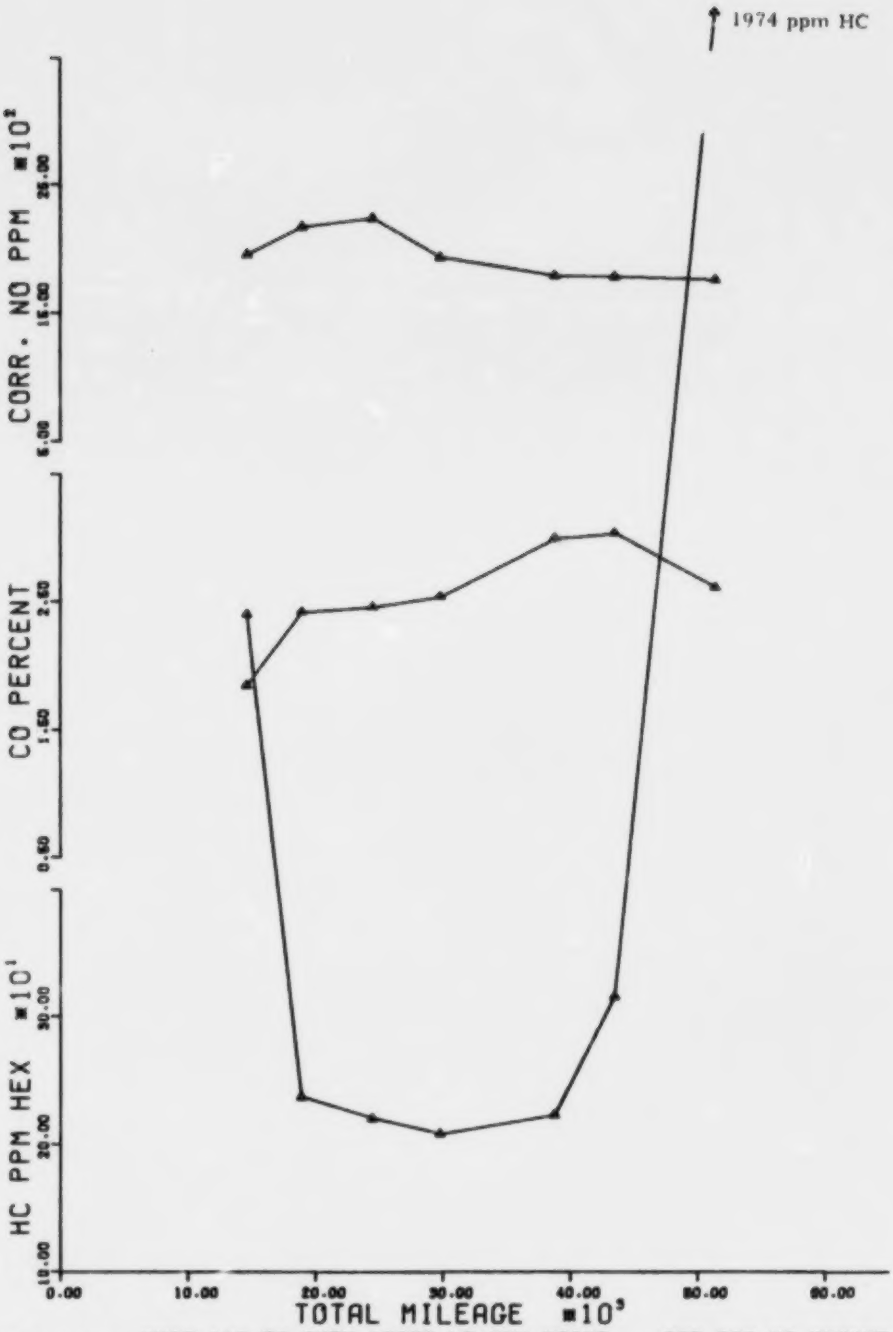


FIGURE E-112. UNIT 112 70 CHEV 10000 LB GVW MAINT. 307 CID V8 ENGINE

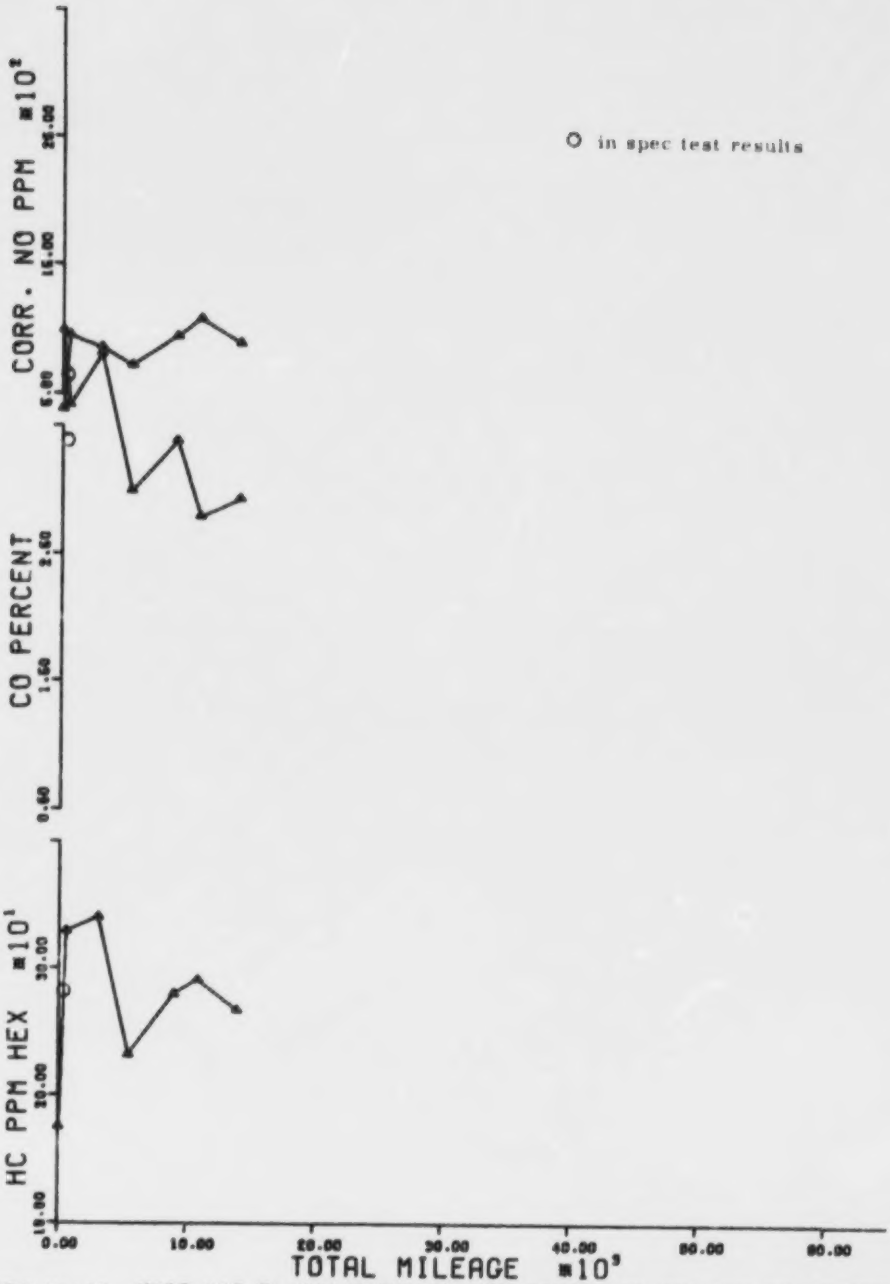


FIGURE D-113. UNIT 113 71 IHC 24000 LB GVW CONSTR.TR 392 CID V8 ENGINE

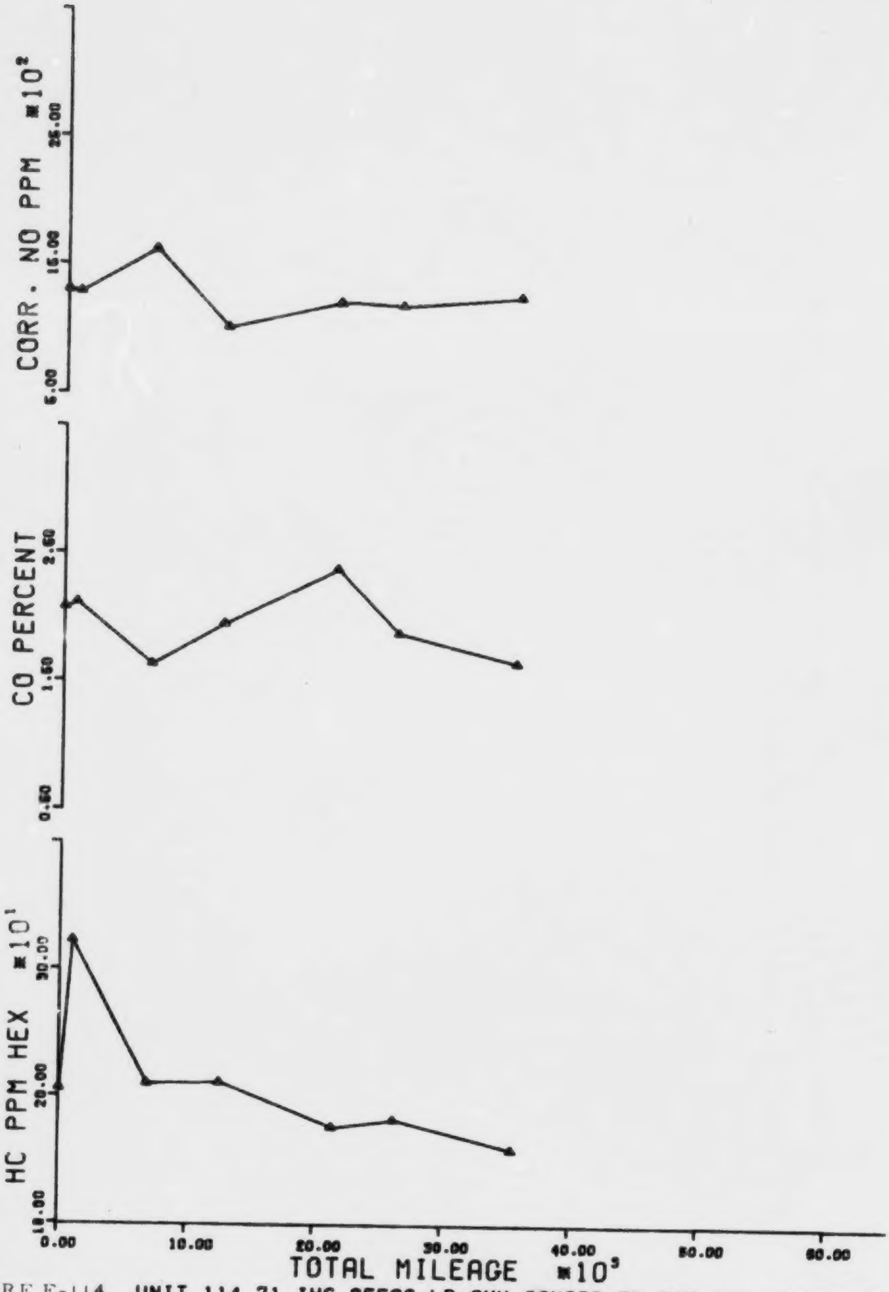


FIGURE E-114. **UNIT 114 71 IHC 25500 LB GVW CONSTR.TR 392 CID /8 ENGINE**

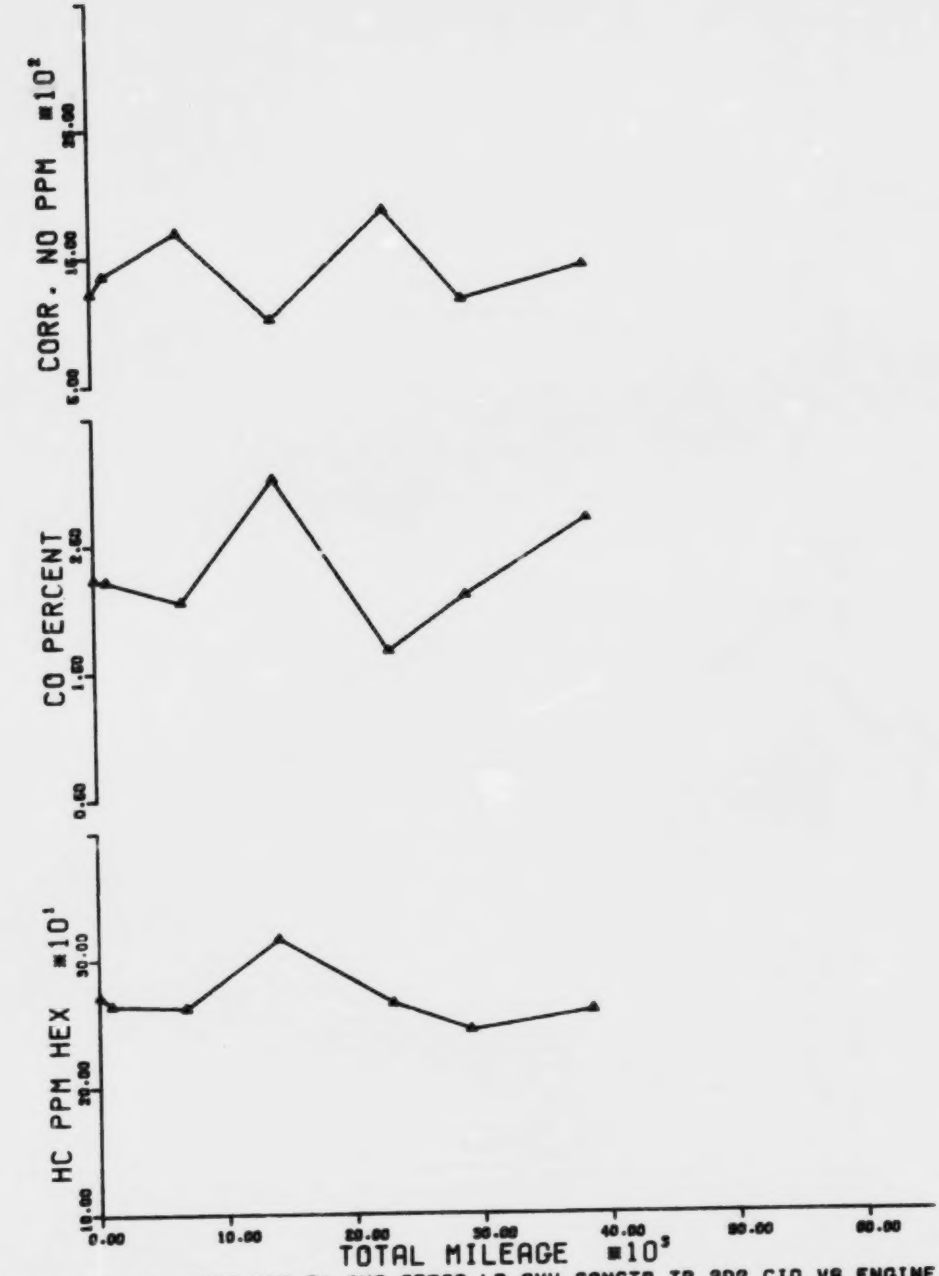


FIGURE E-115. UNIT 115 71 IHC 25500 LB GVW CONSTR.TR 392 CID V8 ENGINE

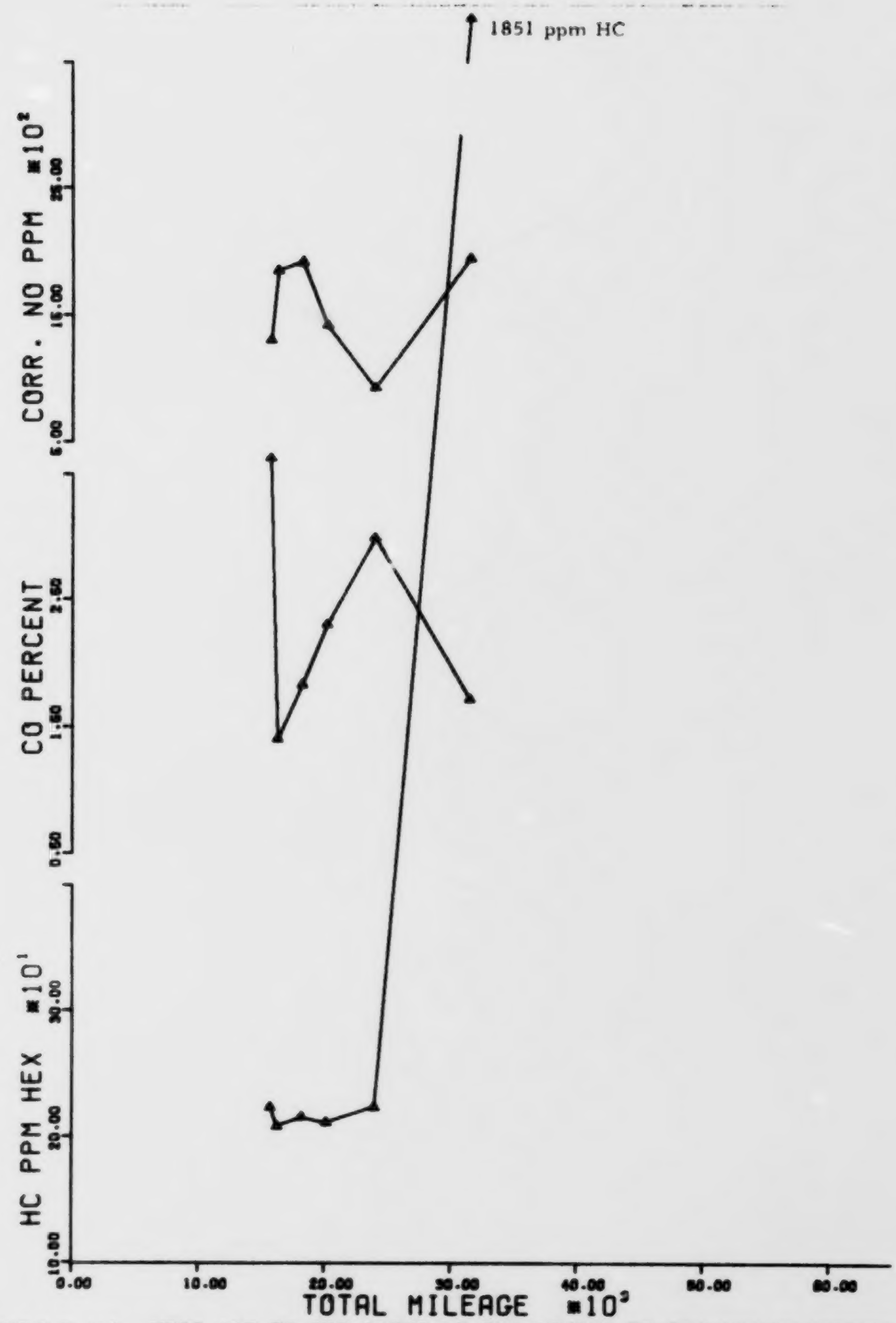


FIGURE E-116. UNIT 116 70 GMC 14000 LB GVW MOVING TR 350 CID V8 ENGINE

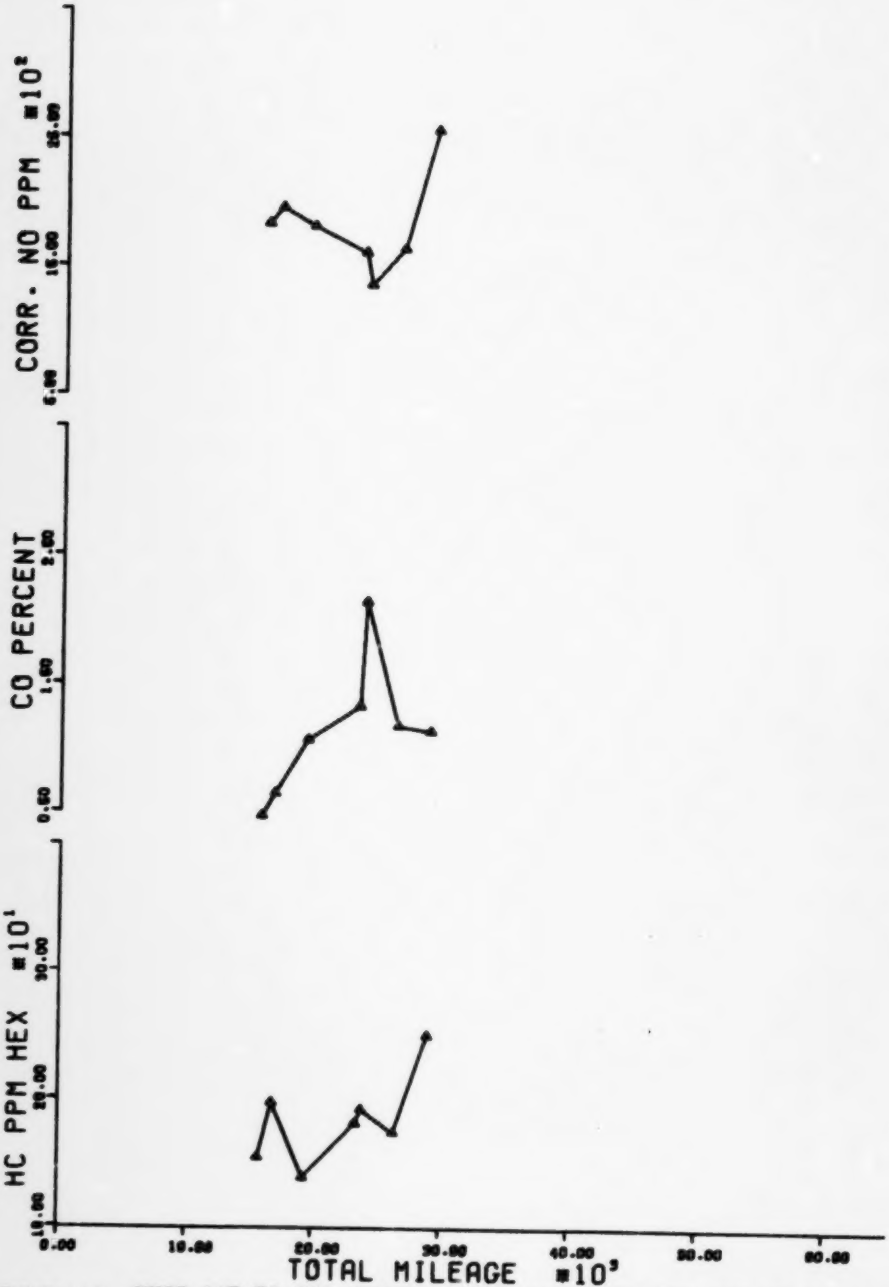


FIGURE E-117. UNIT 117 70 GMC 10000 LB GVW MOVING TR 350 CID V8 ENGINE

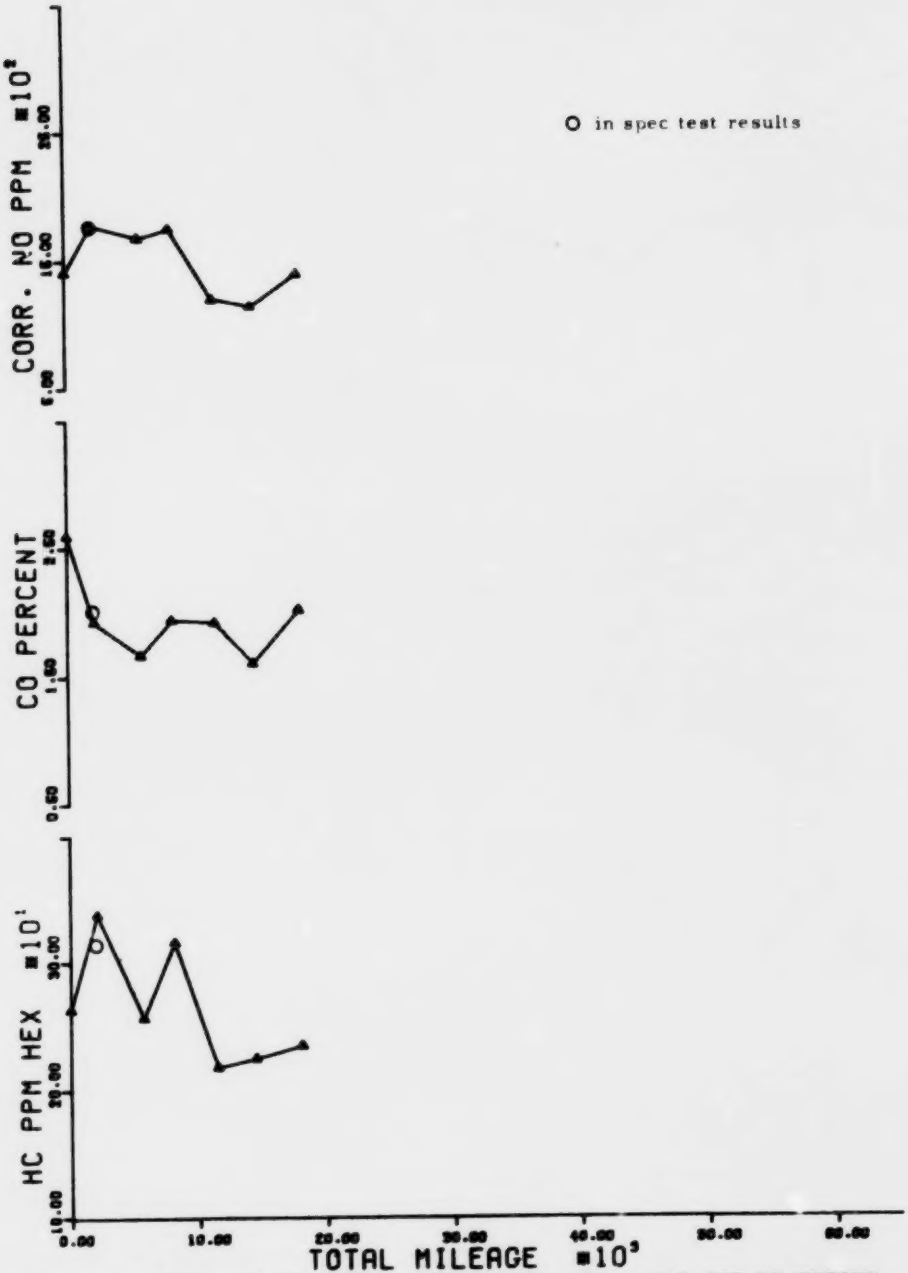


FIGURE E-118. UNIT 118 70 DODGE 10000 LB GVW MAIL 318 CID V8 ENGINE

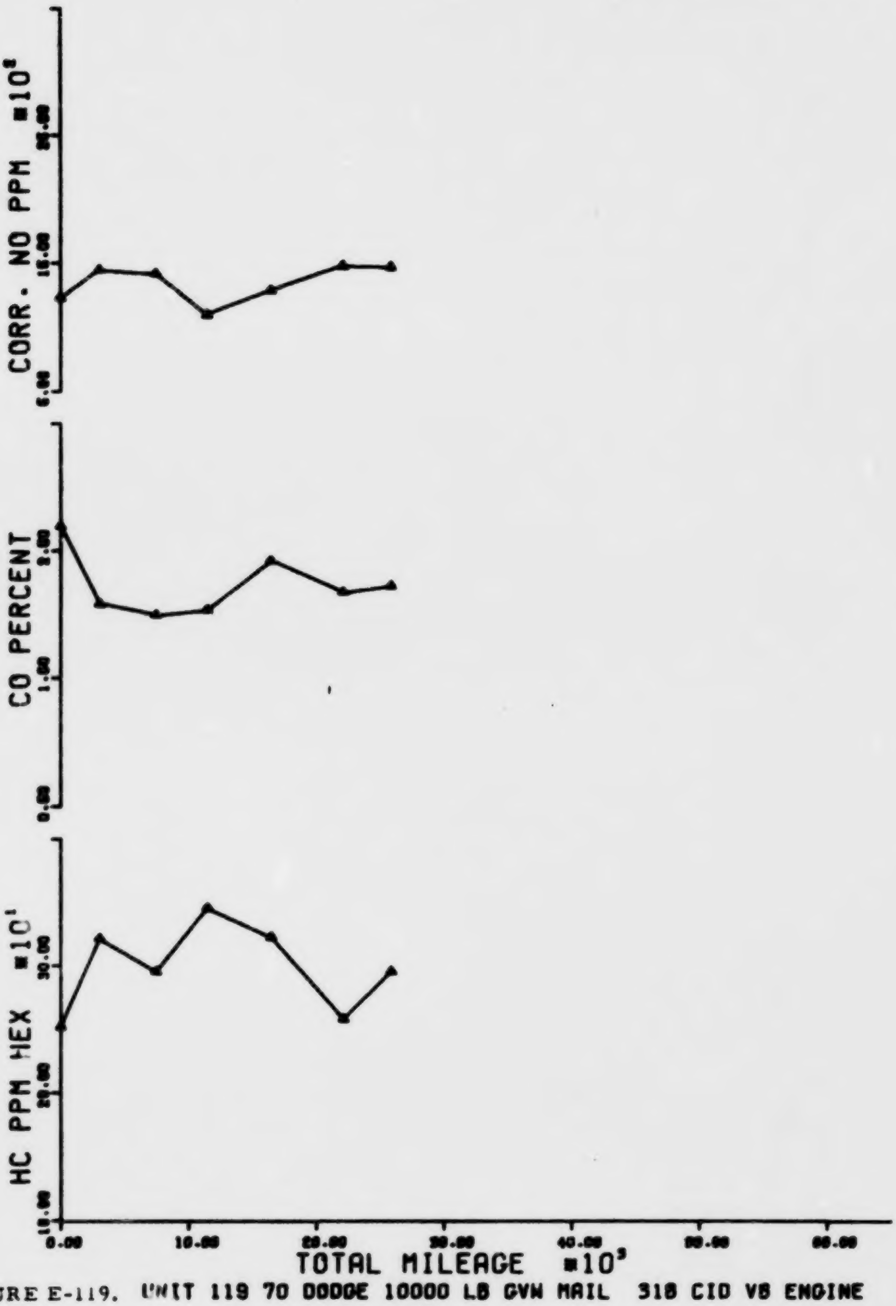


FIGURE E-119. UNIT 119 70 DODGE 10000 LB GVW MAIL 318 CID V8 ENGINE

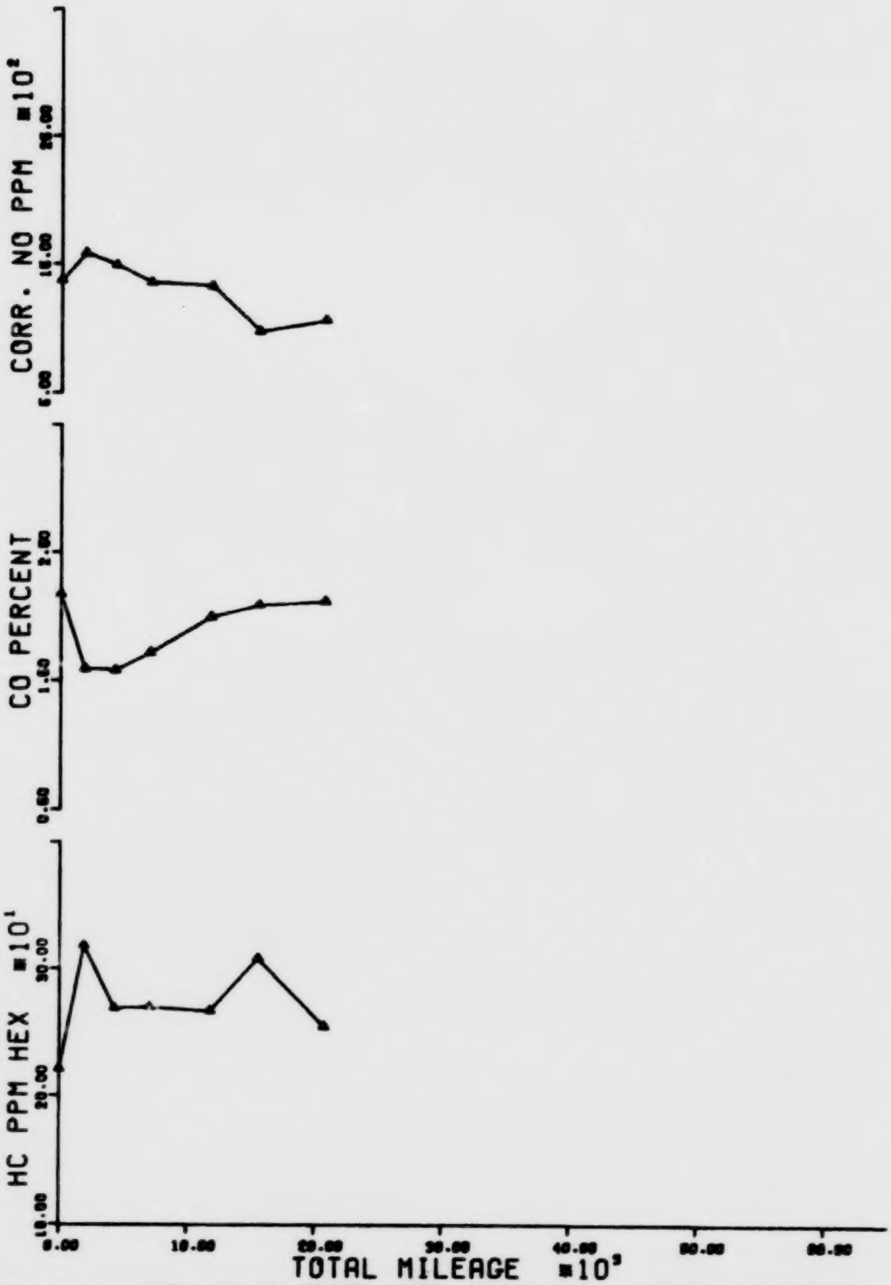


FIGURE E-120. UNIT 120 70 DODGE 10000 LB GVW MAIL 318 CID V8 ENGINE

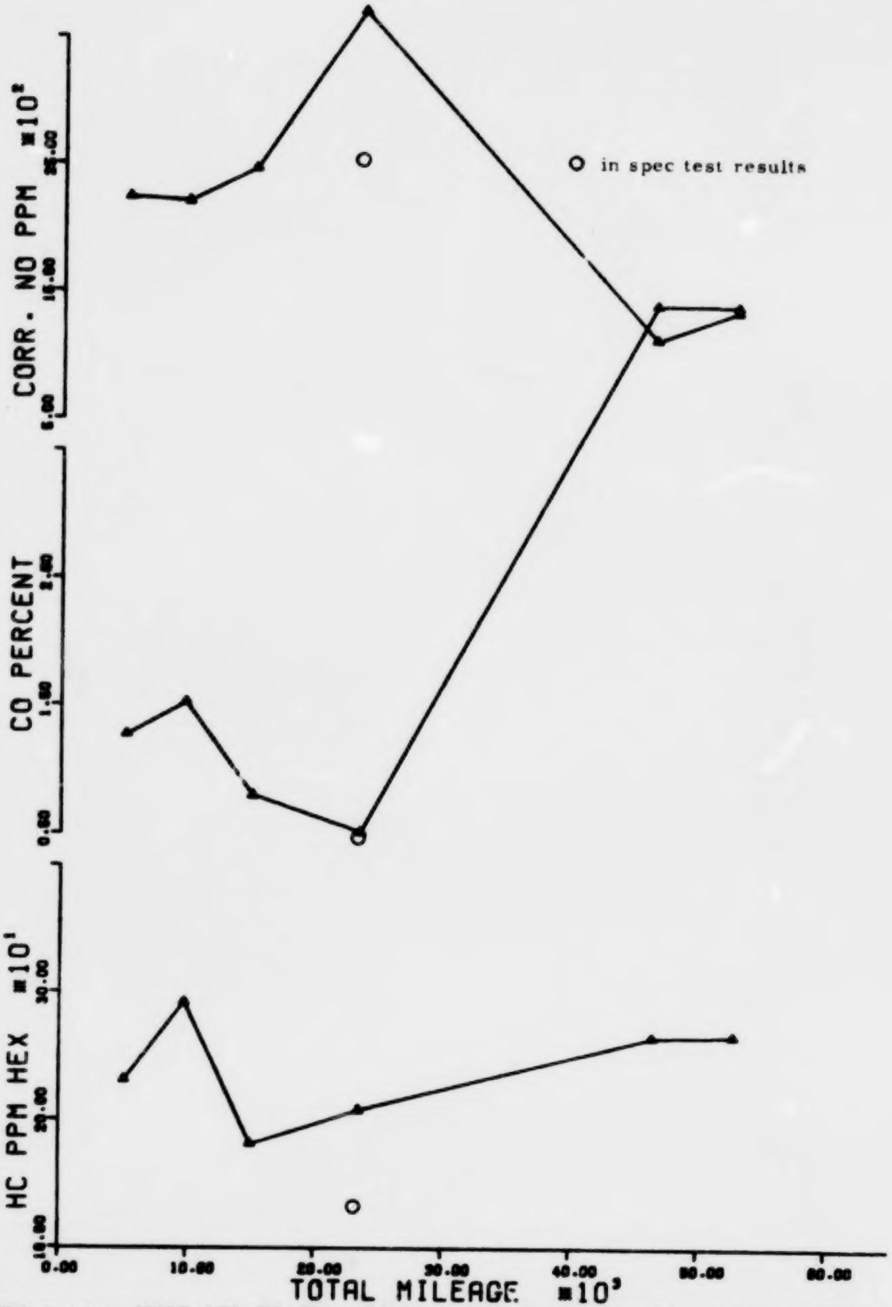


FIGURE E-121. UNIT 121 70 GMC 10000 LB GVW DELIVERY 292 CID I6 ENGINE

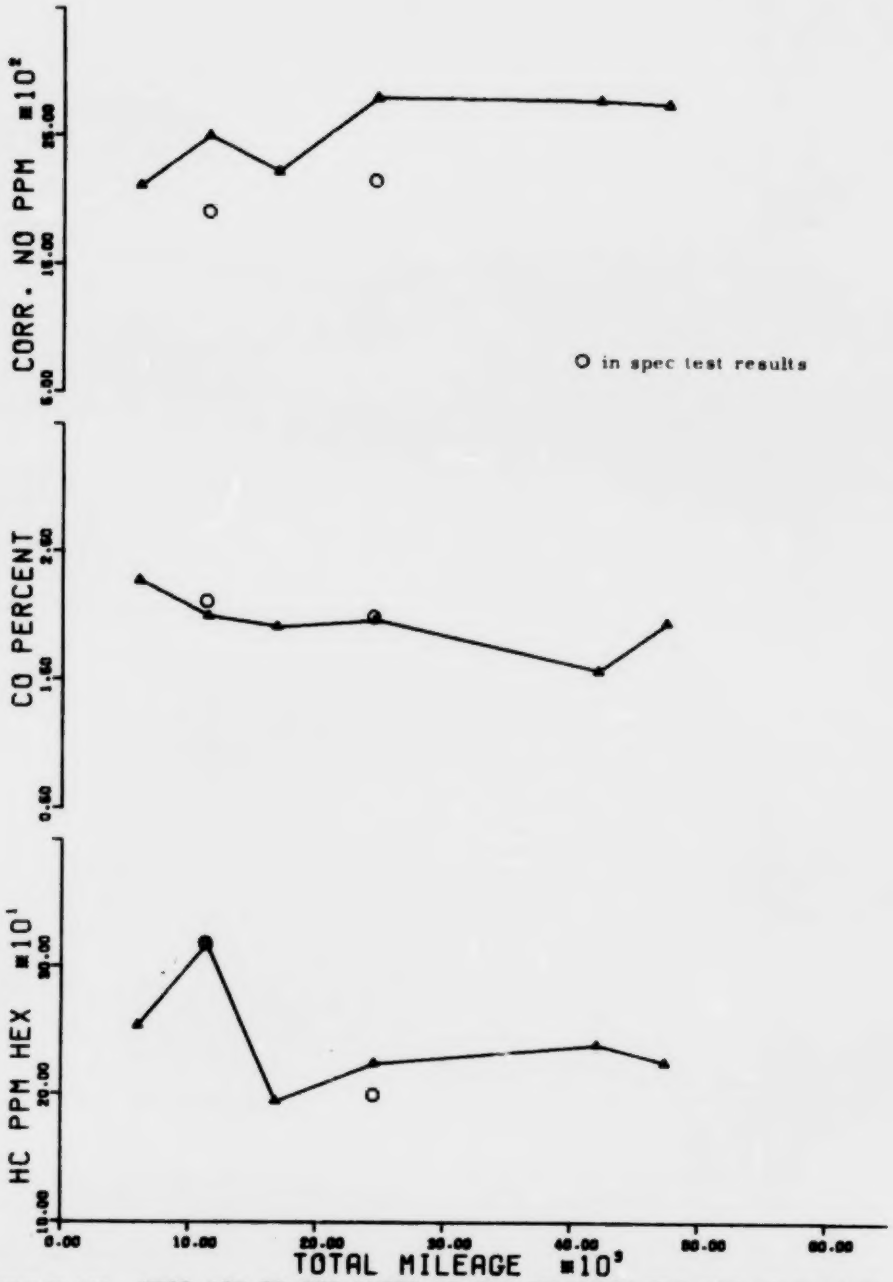


FIGURE E-122. **UNIT 122 70 GMC 10000 LB GVW DELIVERY 292 CID I6 ENGINE**

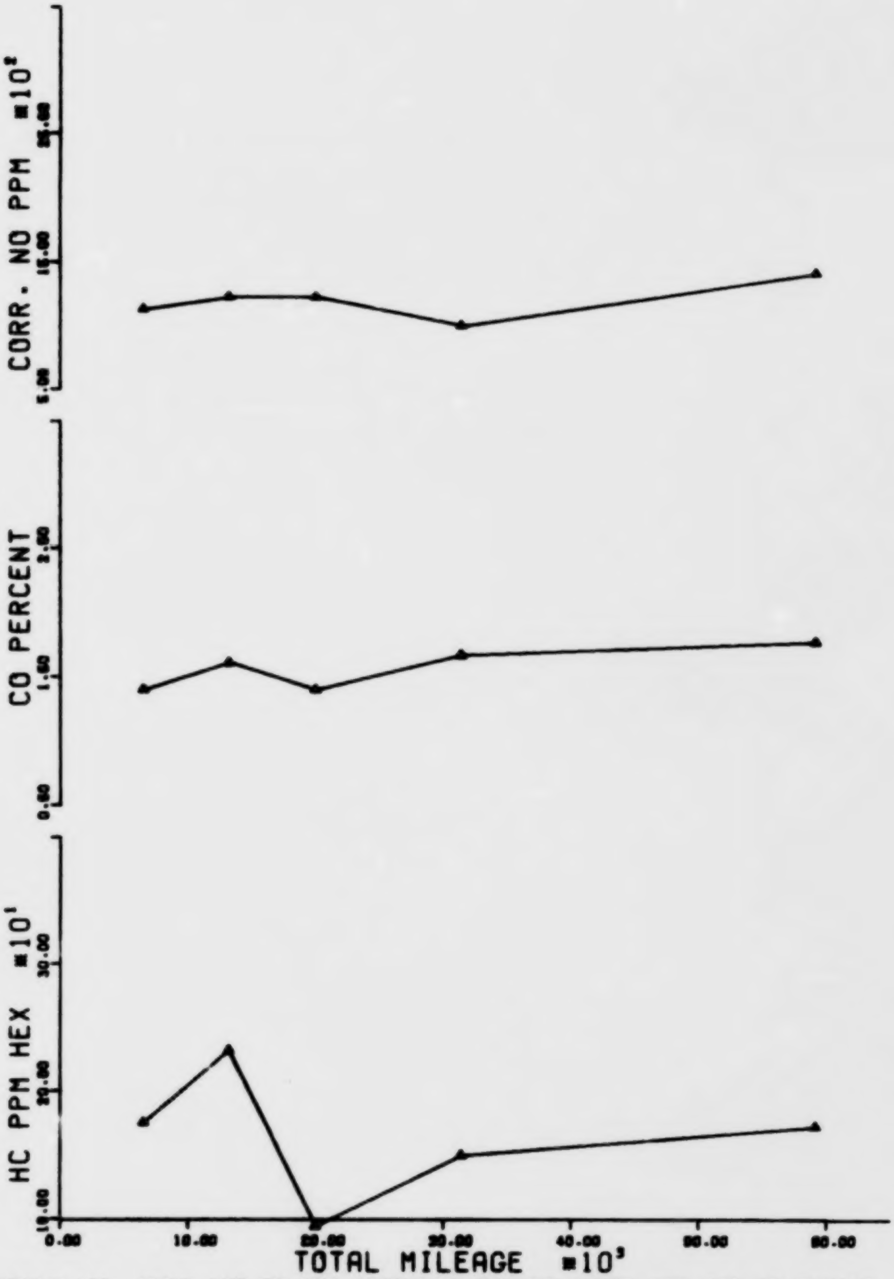


FIGURE E-123. UNIT 123 70 GMC 10000 LB GVW DELIVERY 292 CID I6 ENGINE

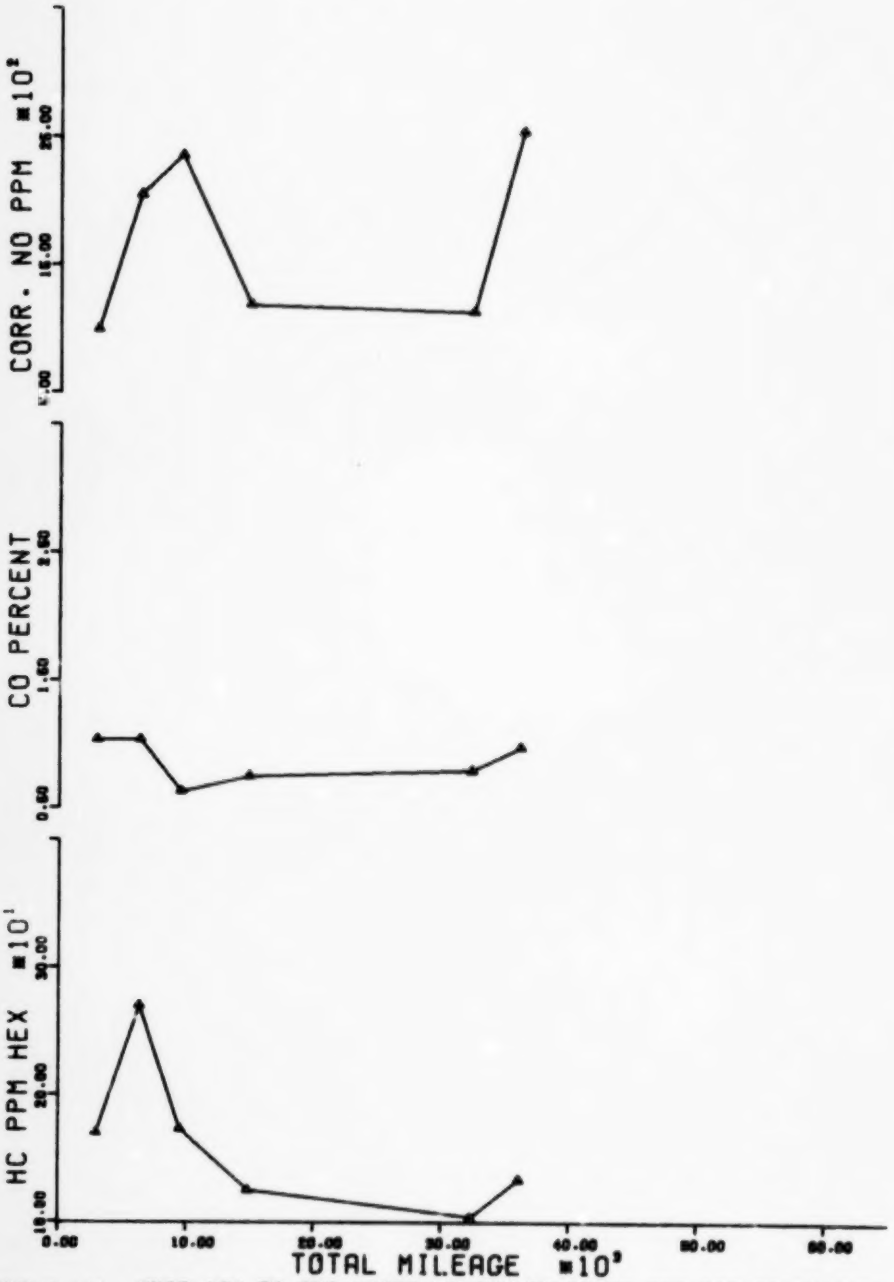


FIGURE E-124. UNIT 124 70 GMC 10000 LB GVW DELIVERY 292 CID I6 ENGINE

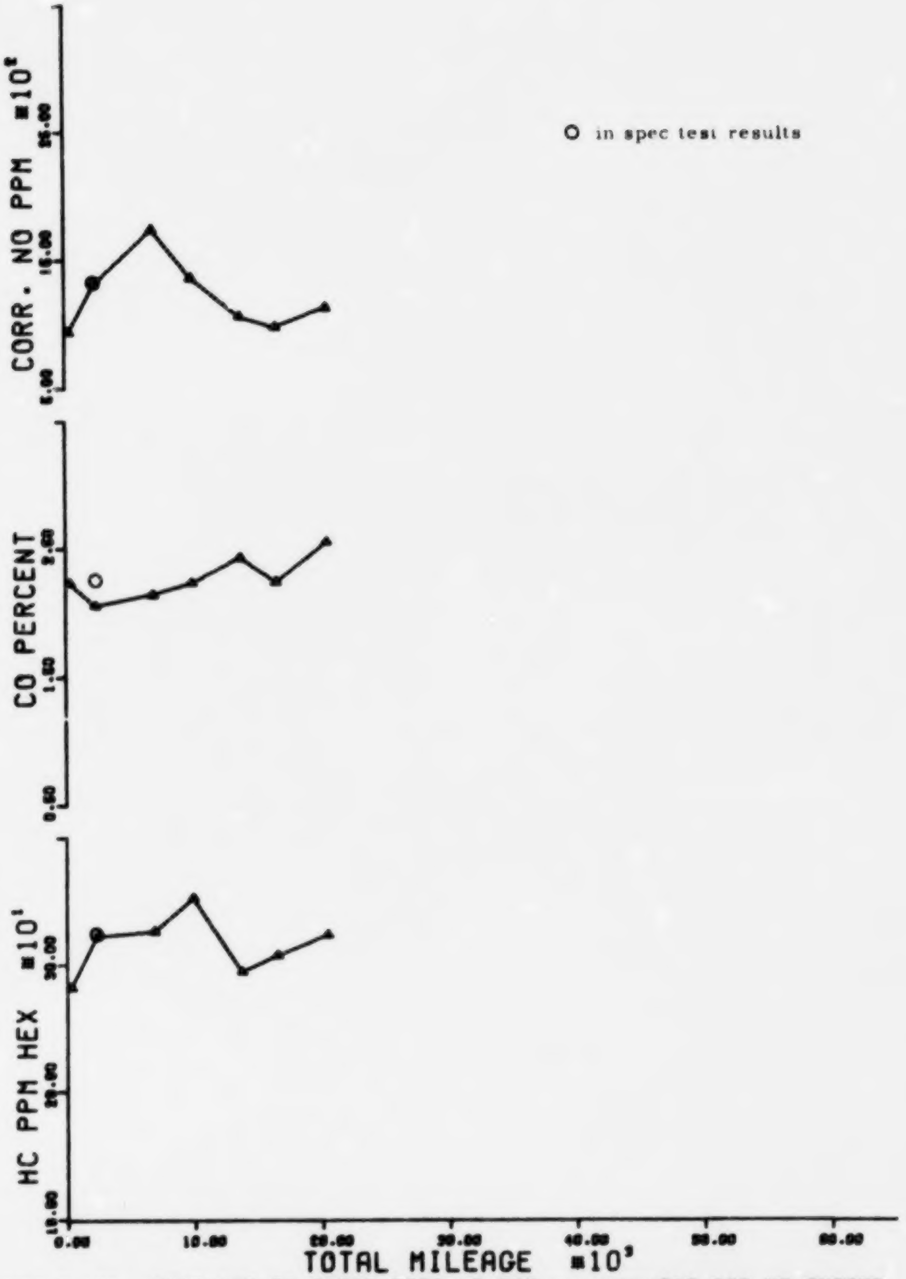


FIGURE E-125. UNIT 125 70 DODGE 7000 LB GVW DELIVERY 318 CID V8 ENGINE

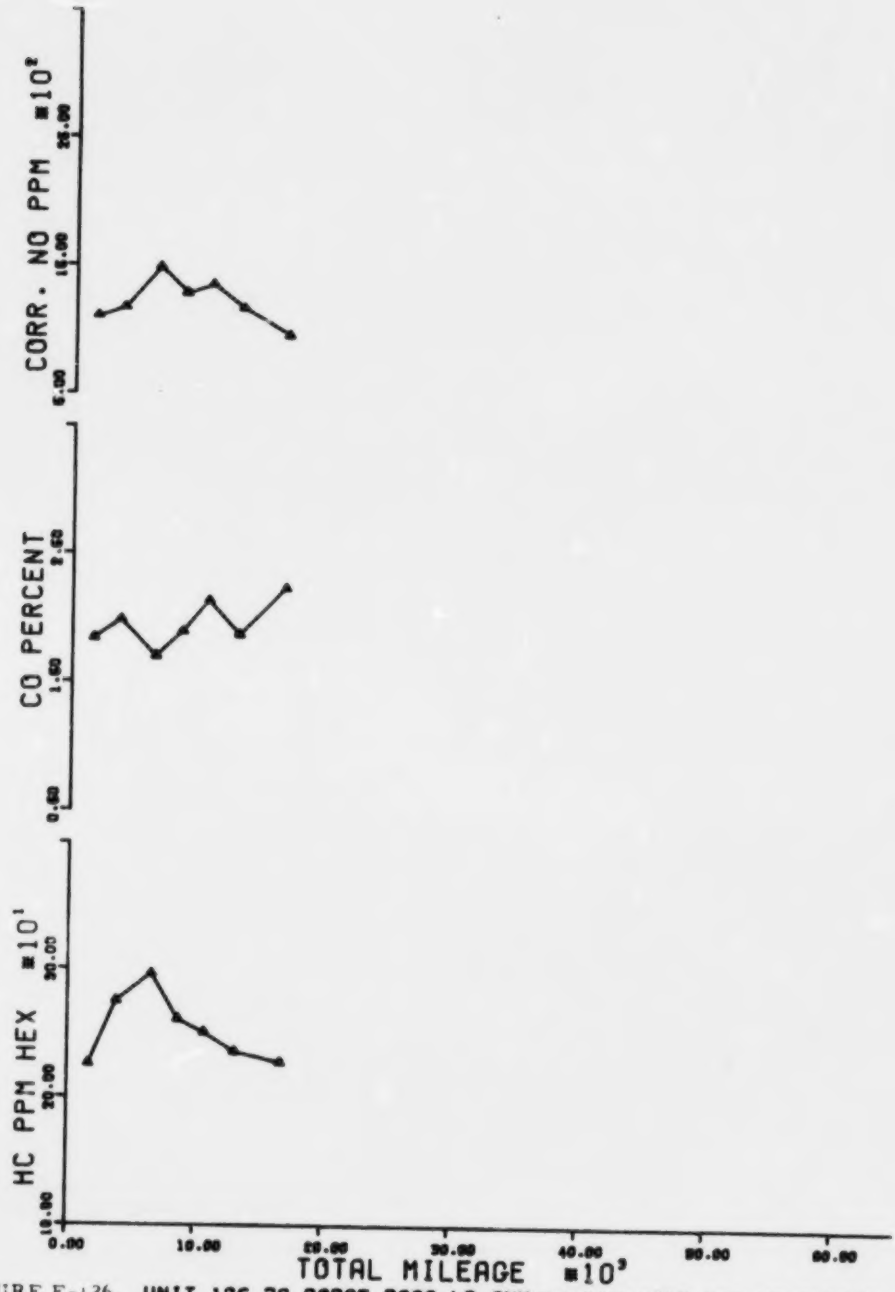


FIGURE E-126. UNIT 126 70 DODGE 7000 LB GVW DELIVERY 318 CID V8 ENGINE

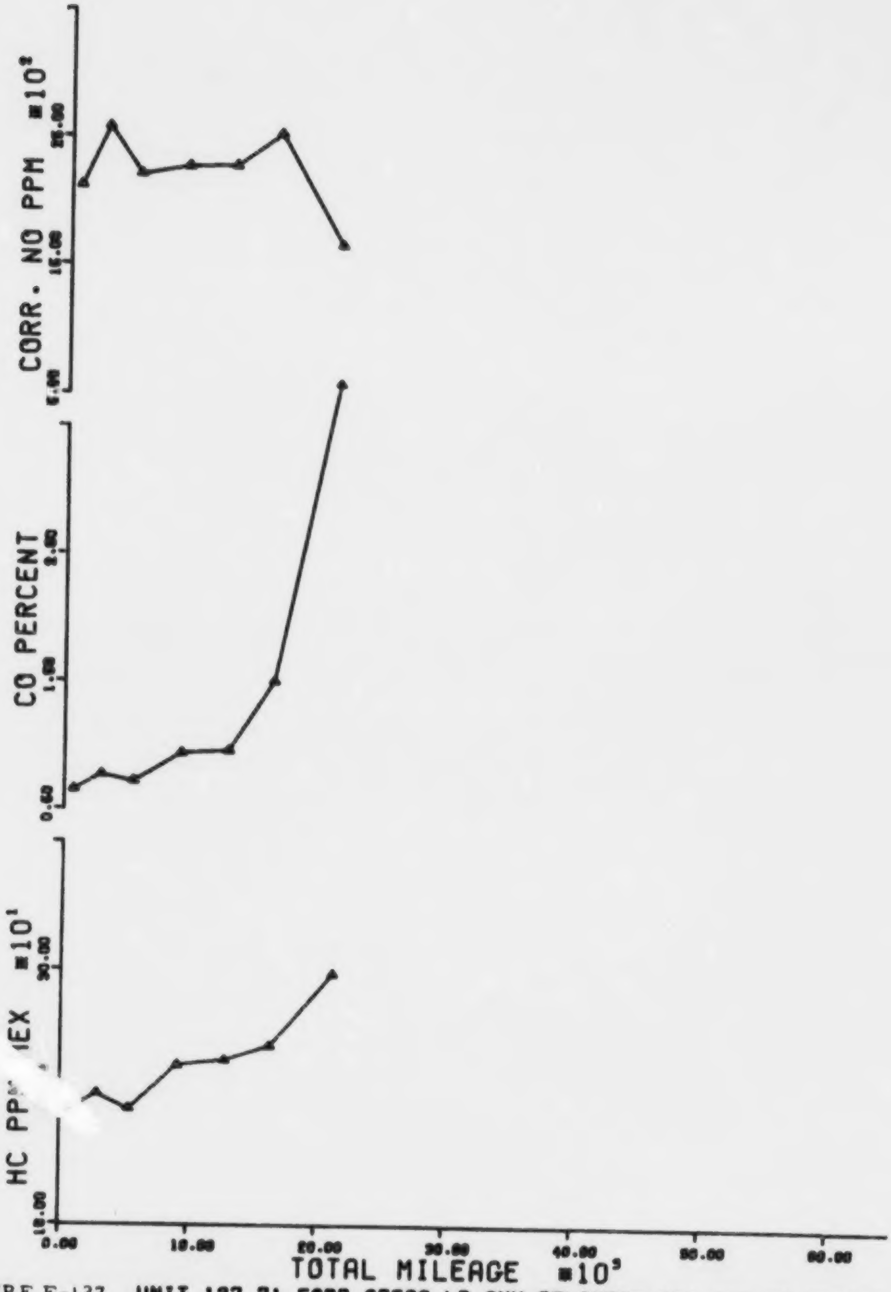


FIGURE E-127. **UNIT 127 71 FORD 27500 LB GVW DELIVERY 391 CID V8 ENGINE**

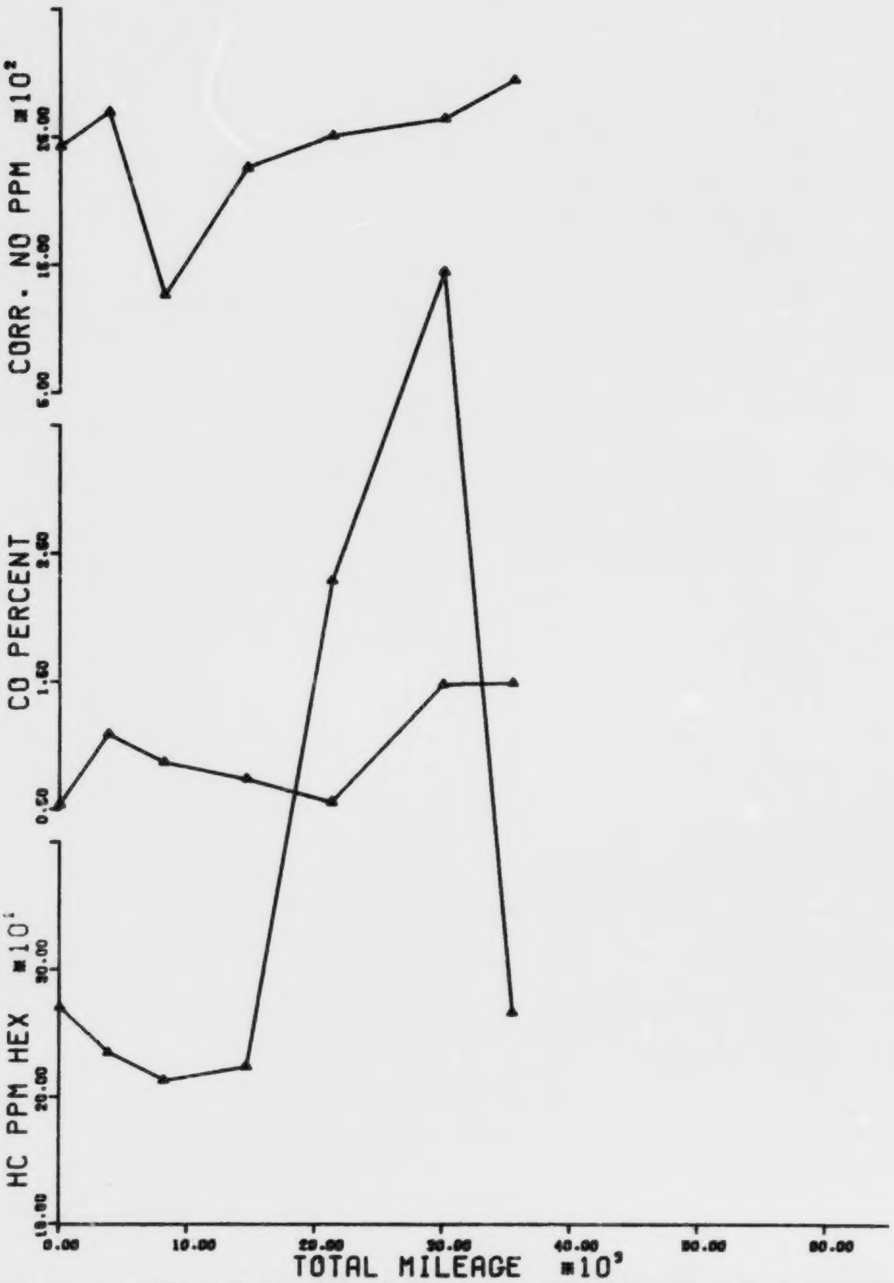


FIGURE E-128. UNIT 128 71 FORD 27500 LB GVW DELIVERY 391 CID V8 ENGINE

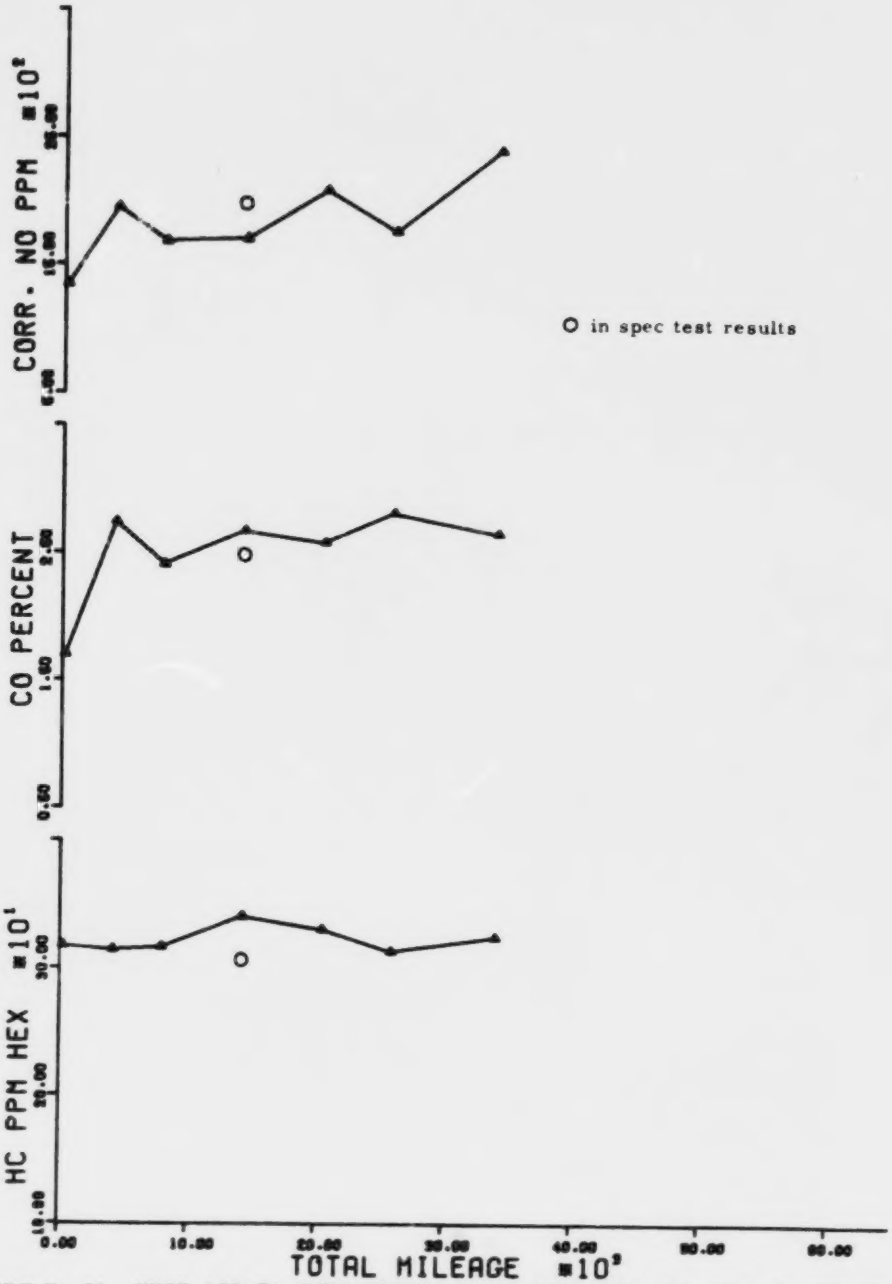


FIGURE E-129. **UNIT 129 71 FORD 27500 LB GVW DELIVERY 391 CID V8 ENGINE**

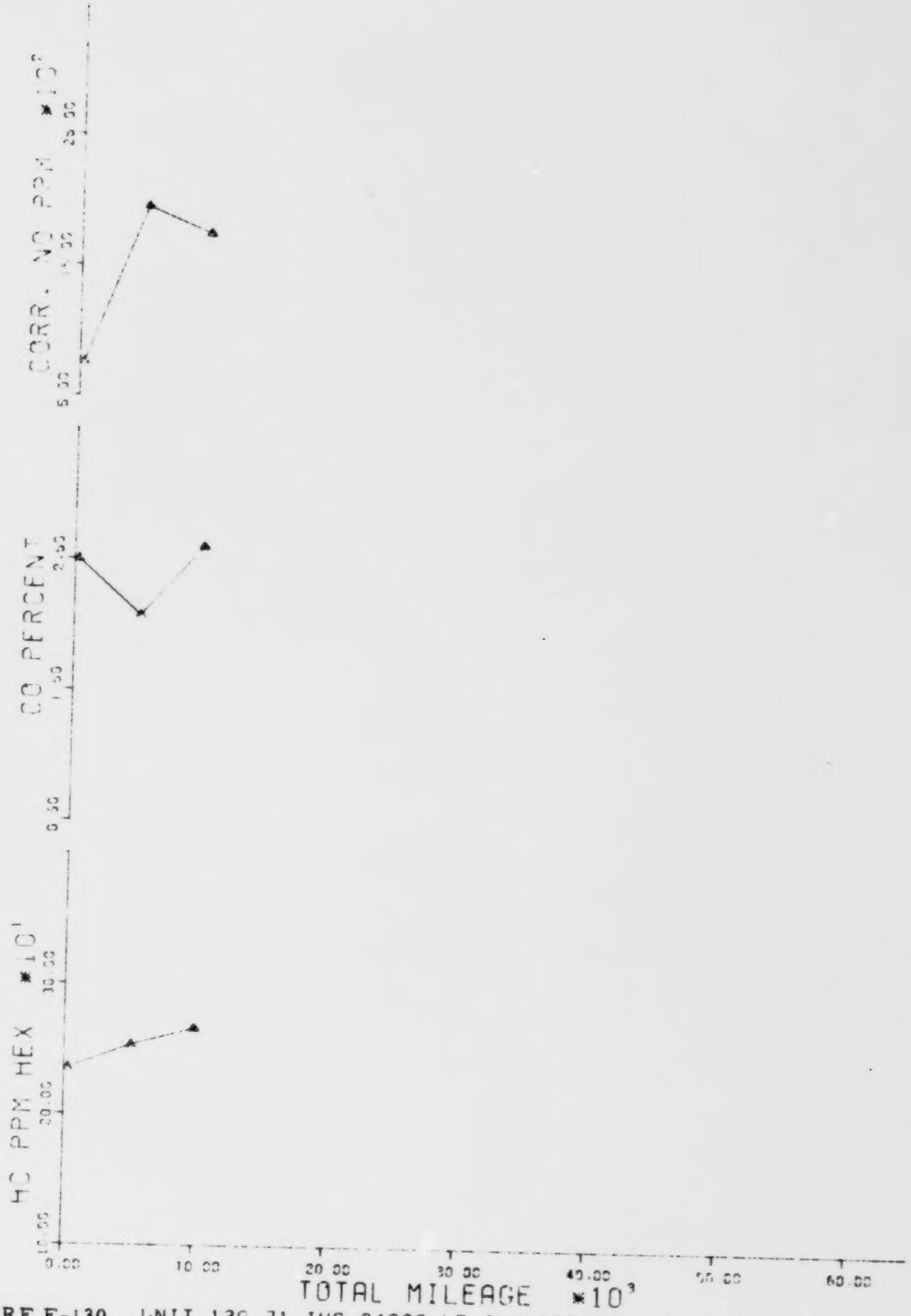


FIGURE E-130. UNIT 130 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

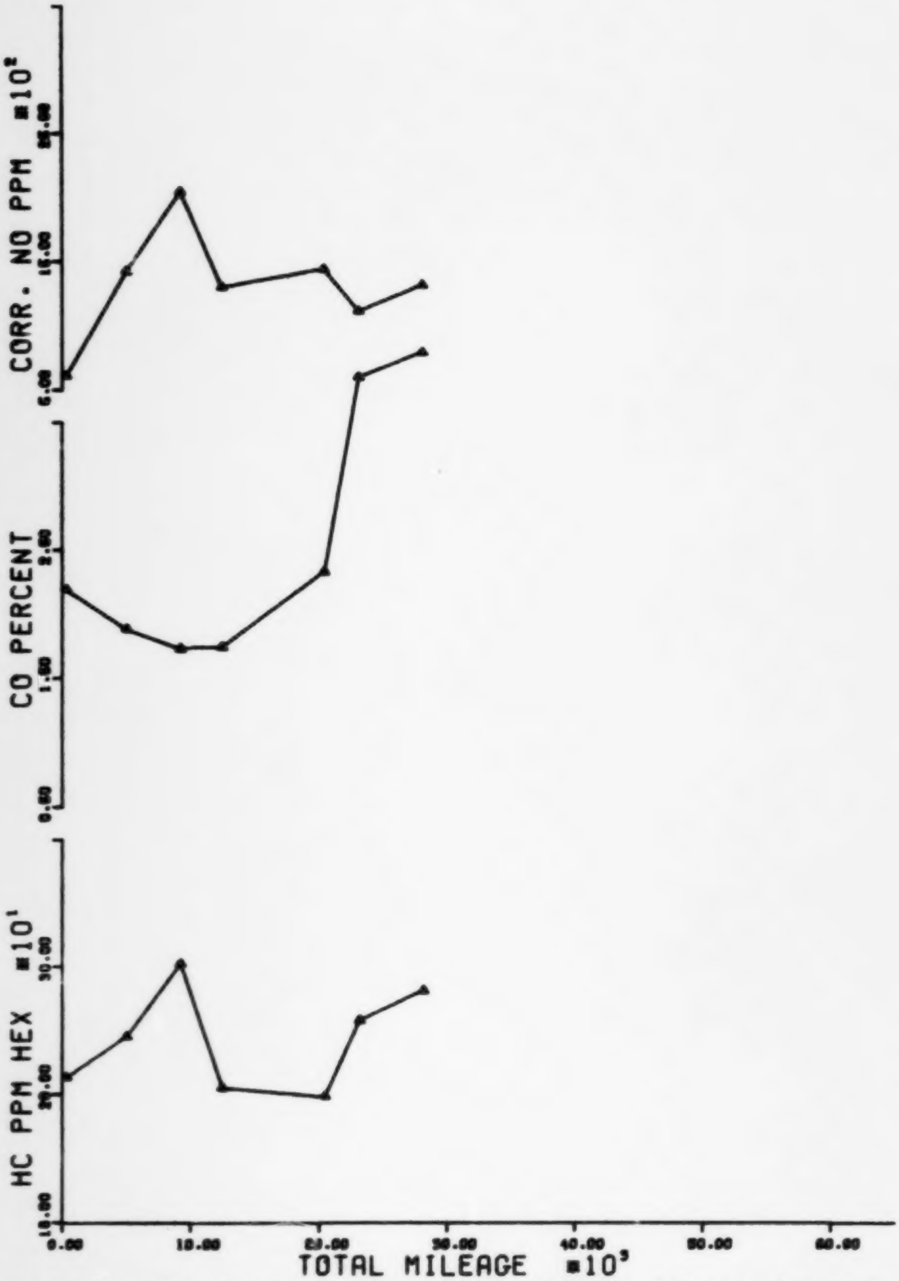


FIGURE E-131. UNIT 131 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

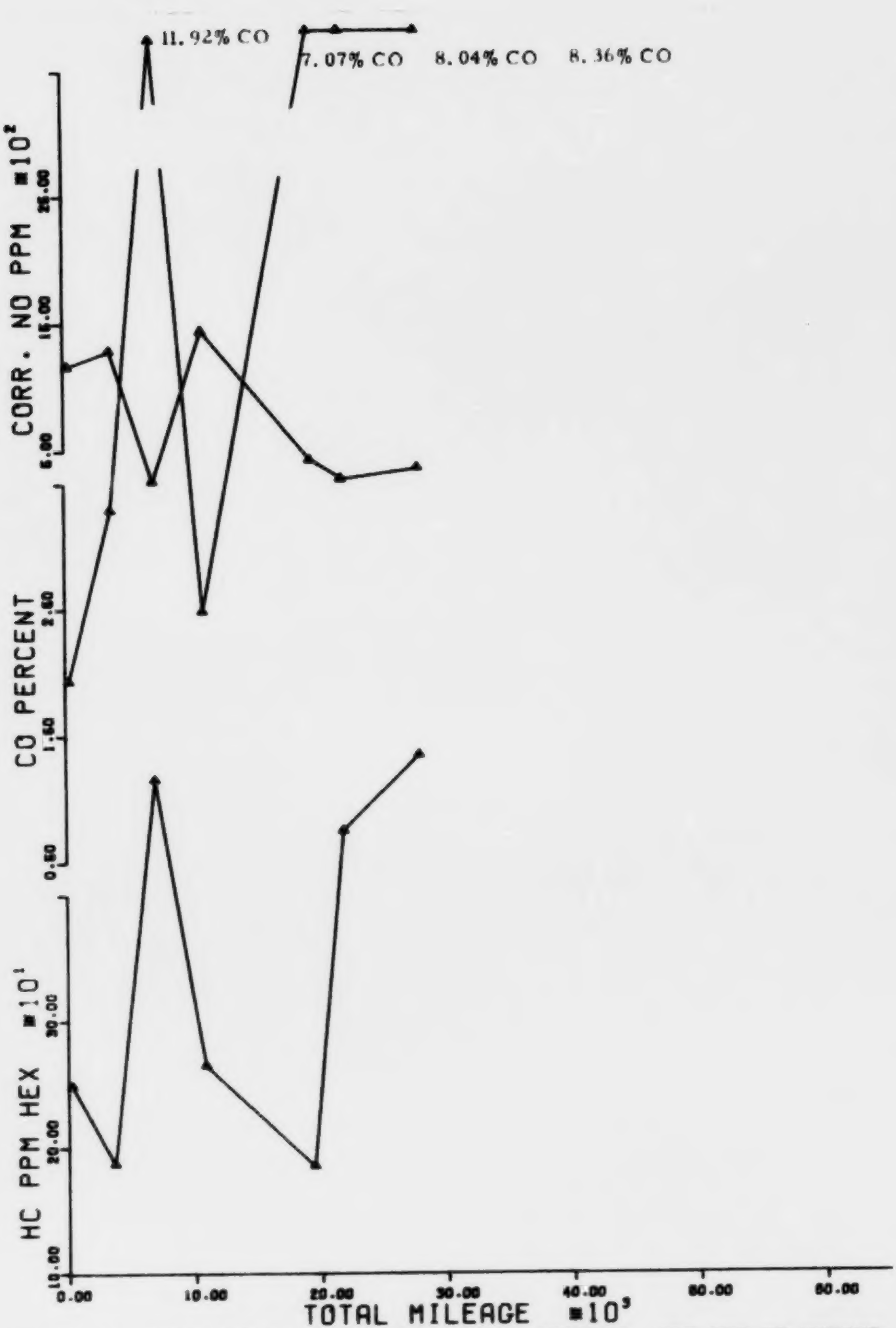


FIGURE E-132. UNIT 132 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

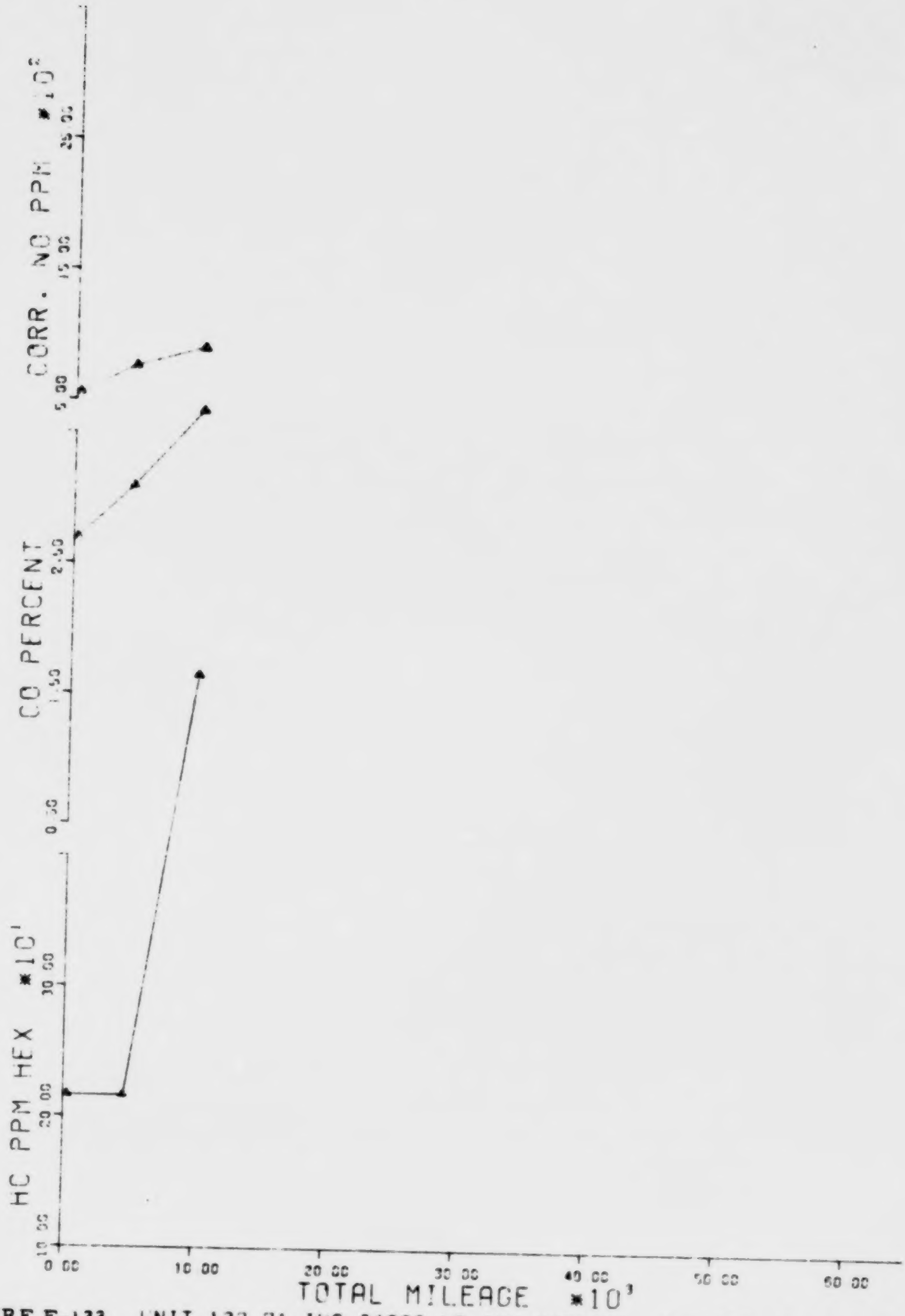


FIGURE E-133. UNIT 133 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

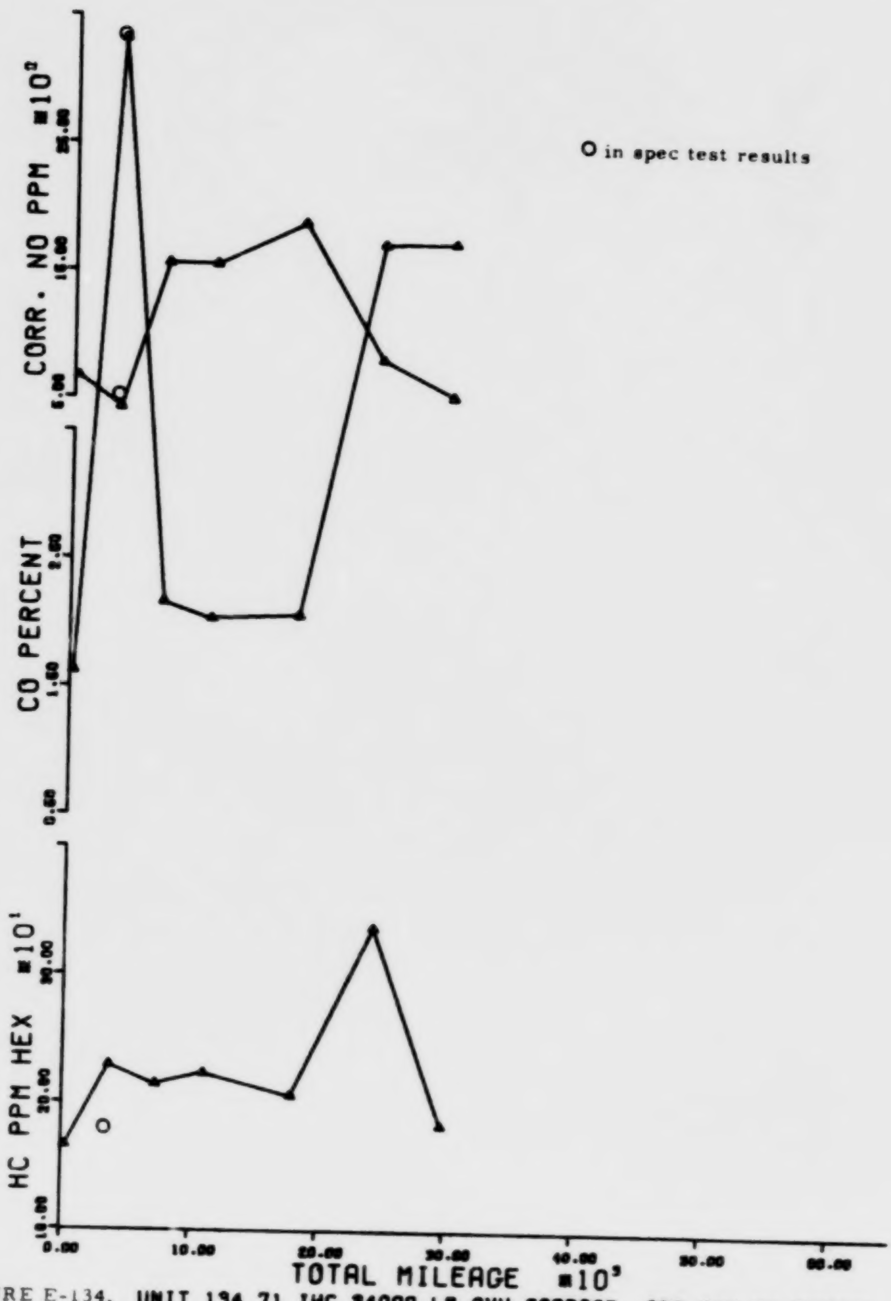


FIGURE E-134. **UNIT 134 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE**

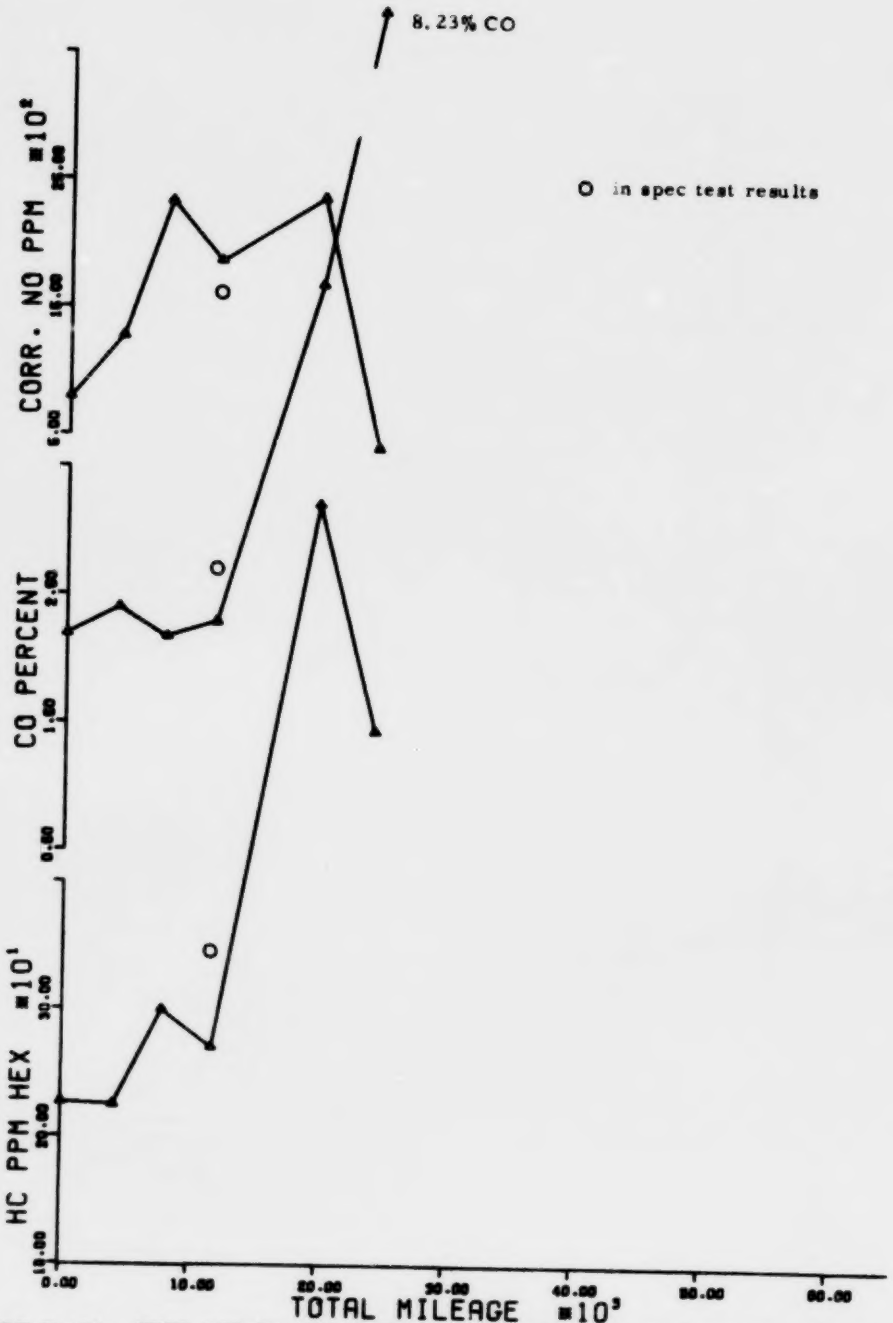


FIGURE E-135. UNIT 135 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

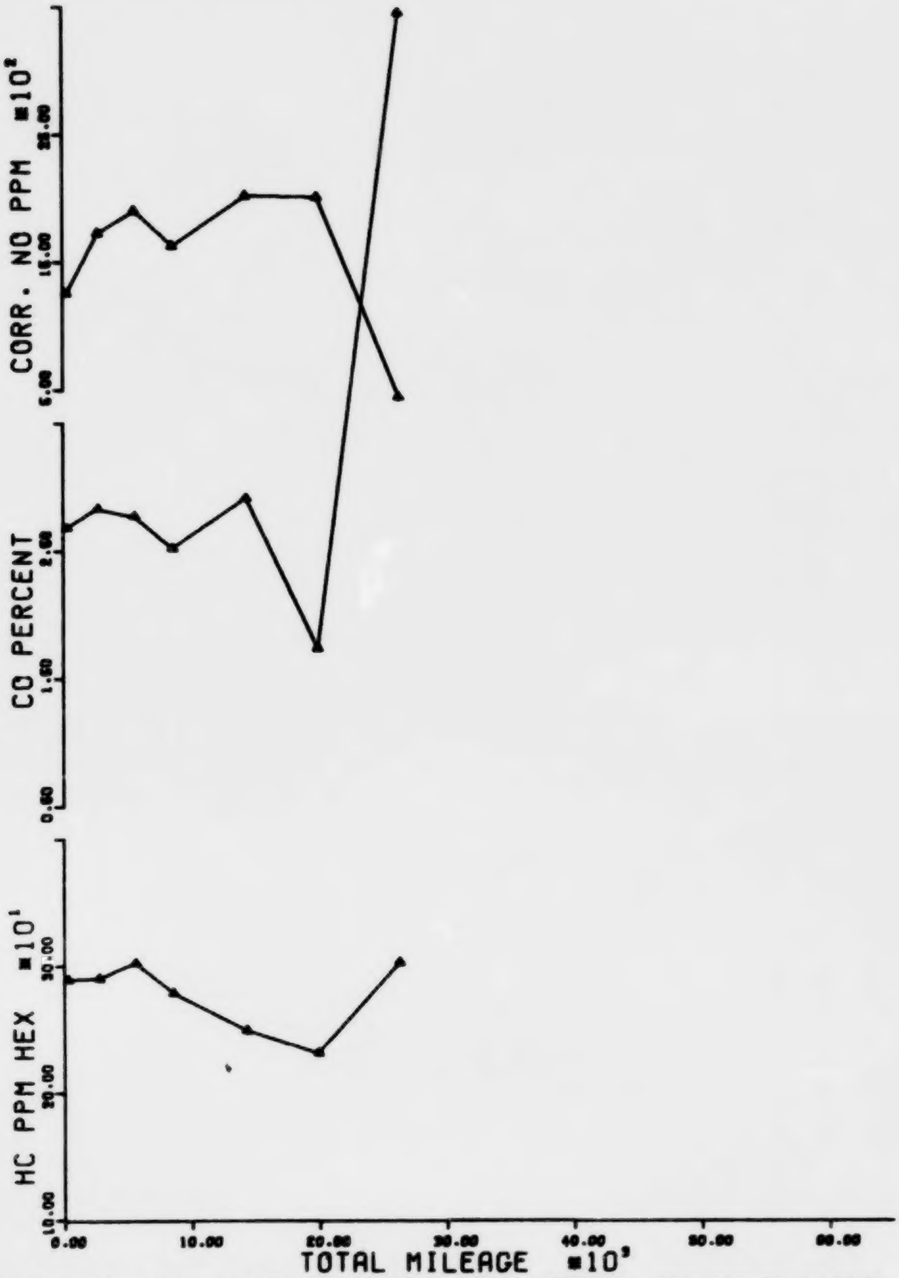


FIGURE E-136. UNIT 136 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

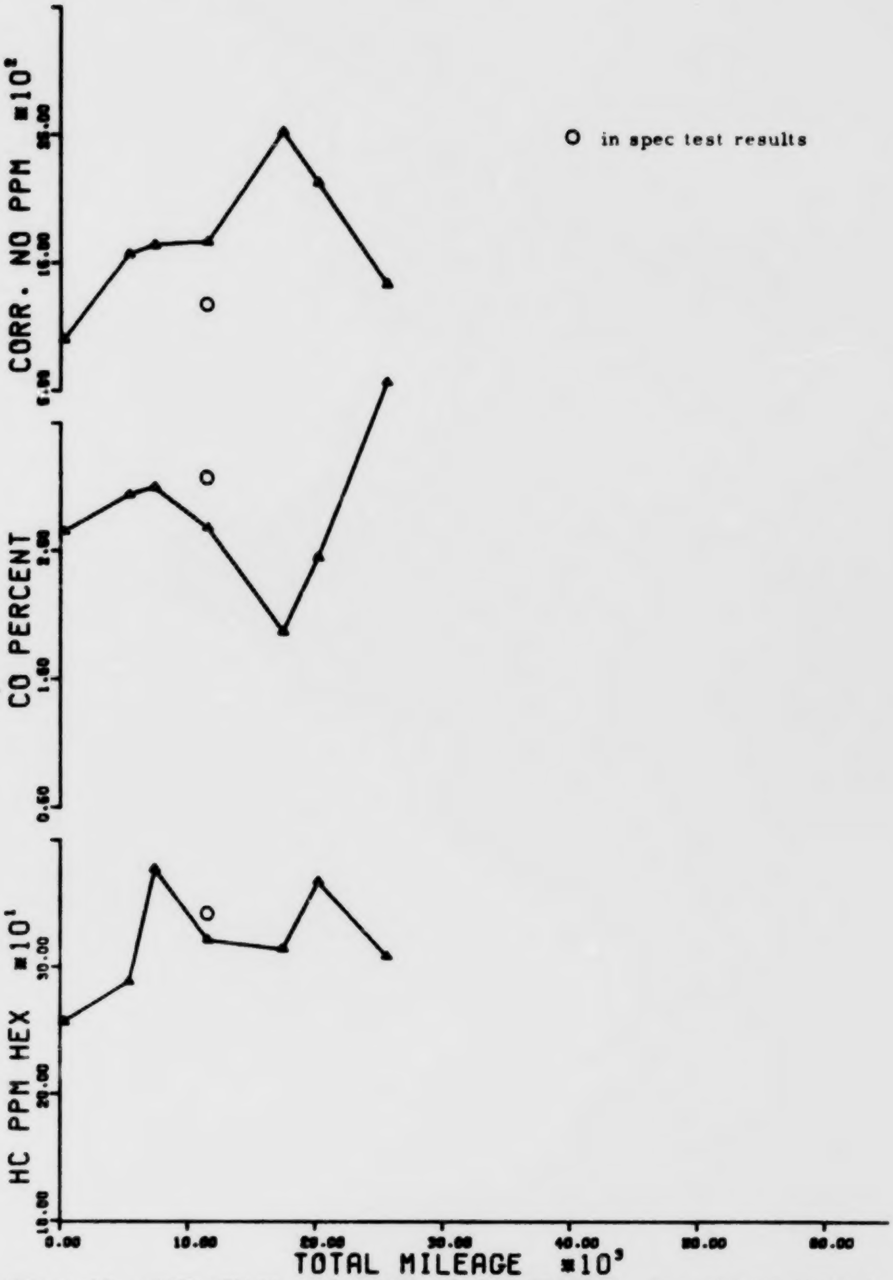


FIGURE E-137. UNIT 137 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

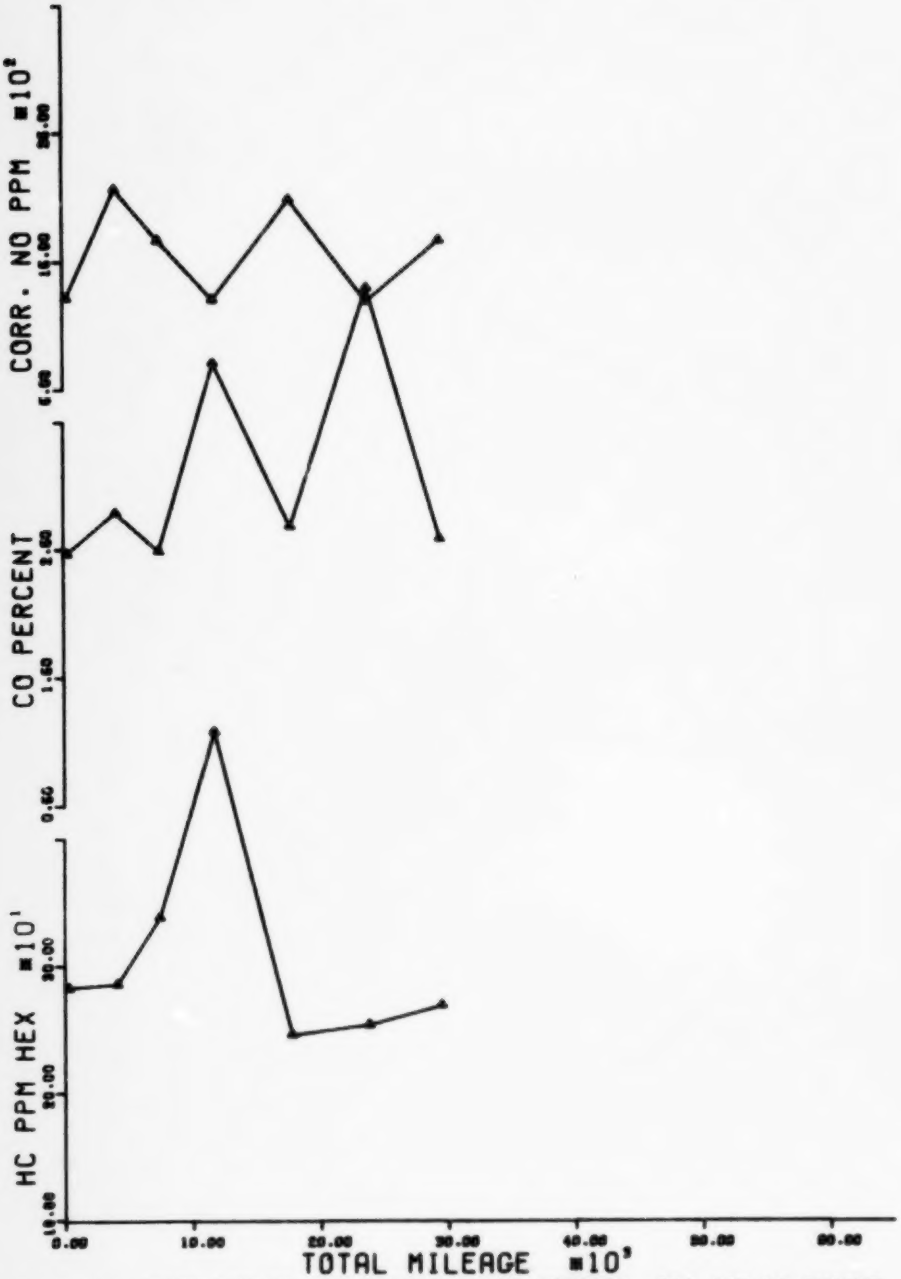


FIGURE E-138. **UNIT 138 71 INC 34000 LB GVW GARBAGE 392 CID V8 ENGINE**

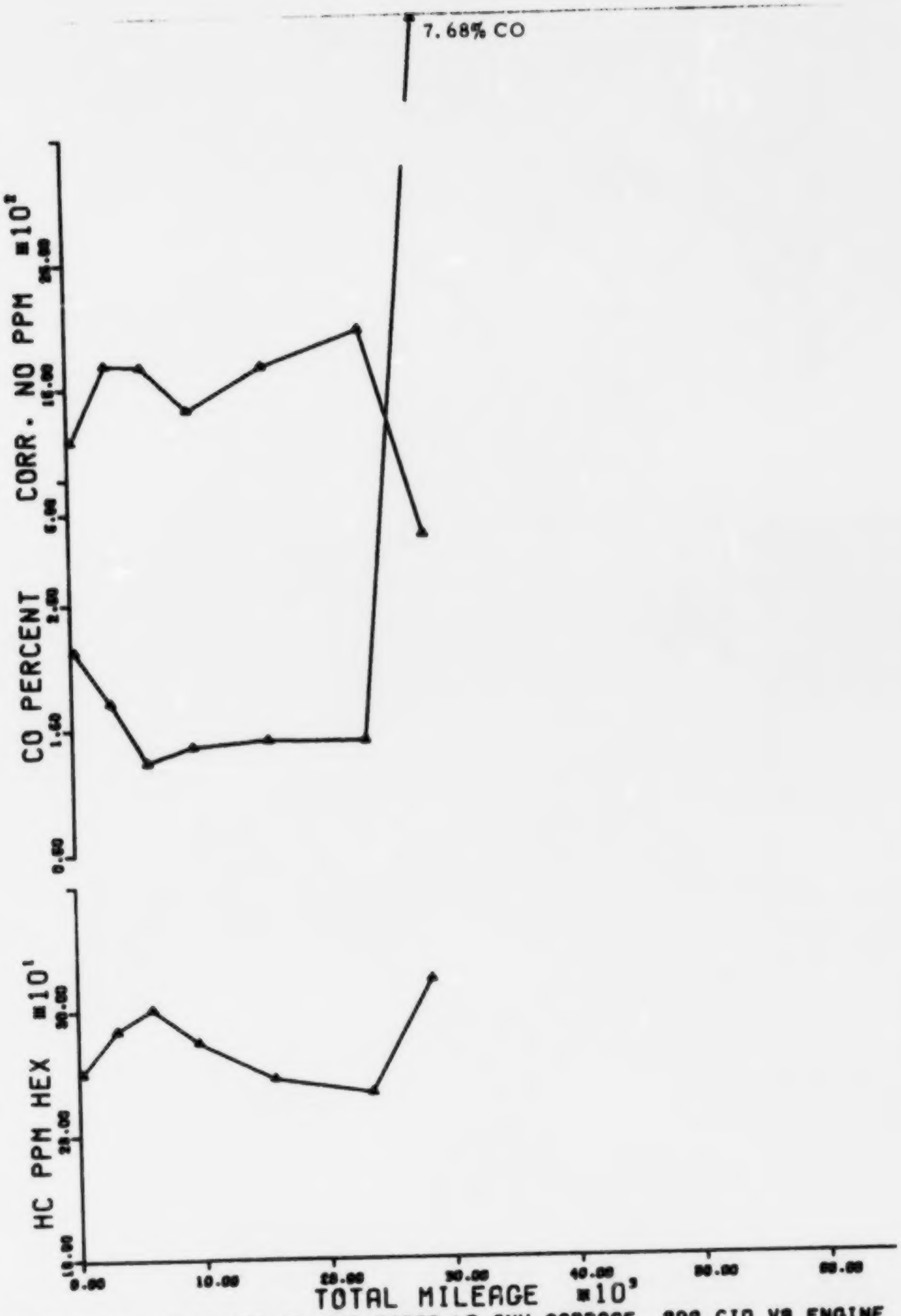


FIGURE E-139. UNIT 139 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

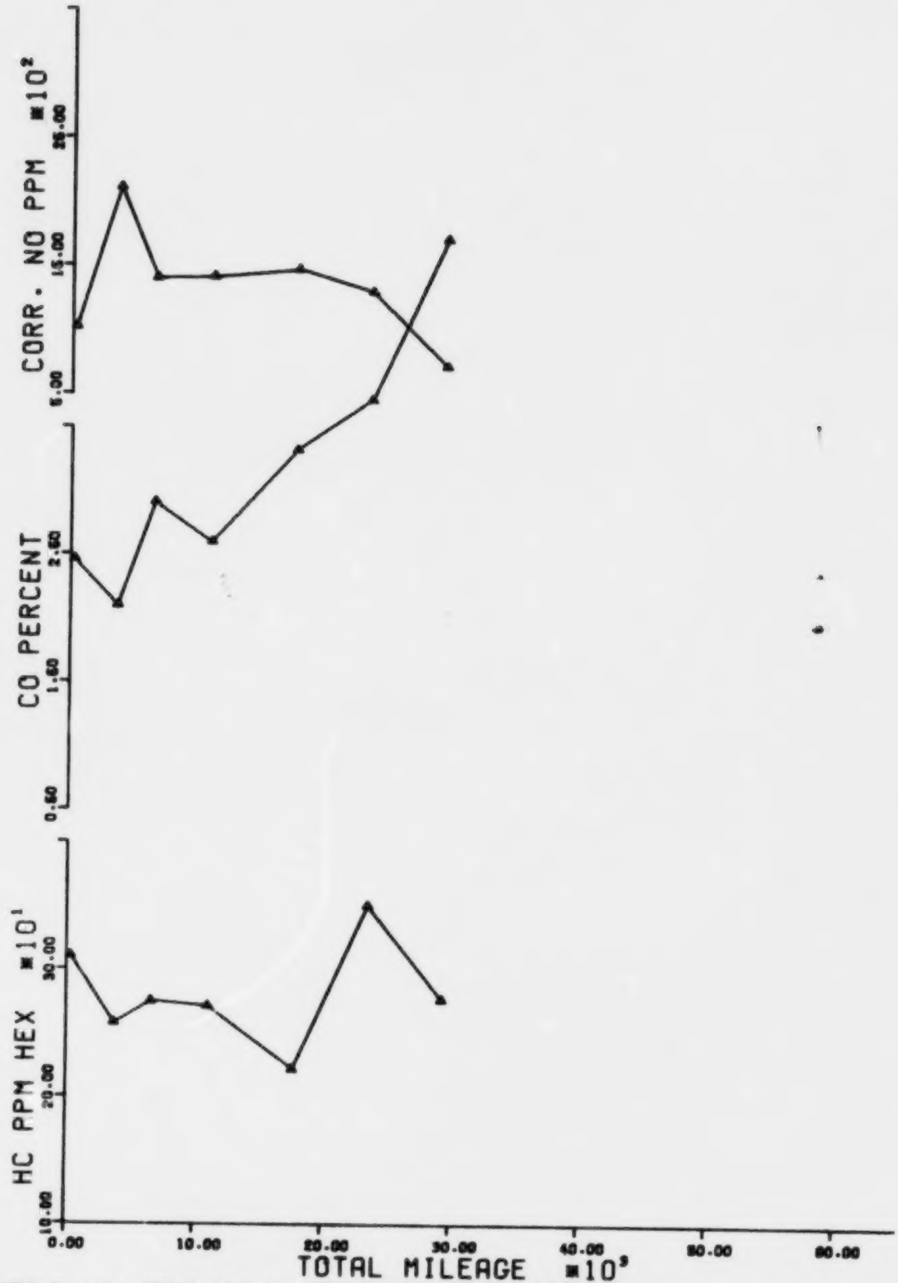


FIGURE E-140. UNIT 140 71 IHC 34000 LB GVW GARBAGE 392 CID V8 ENGINE

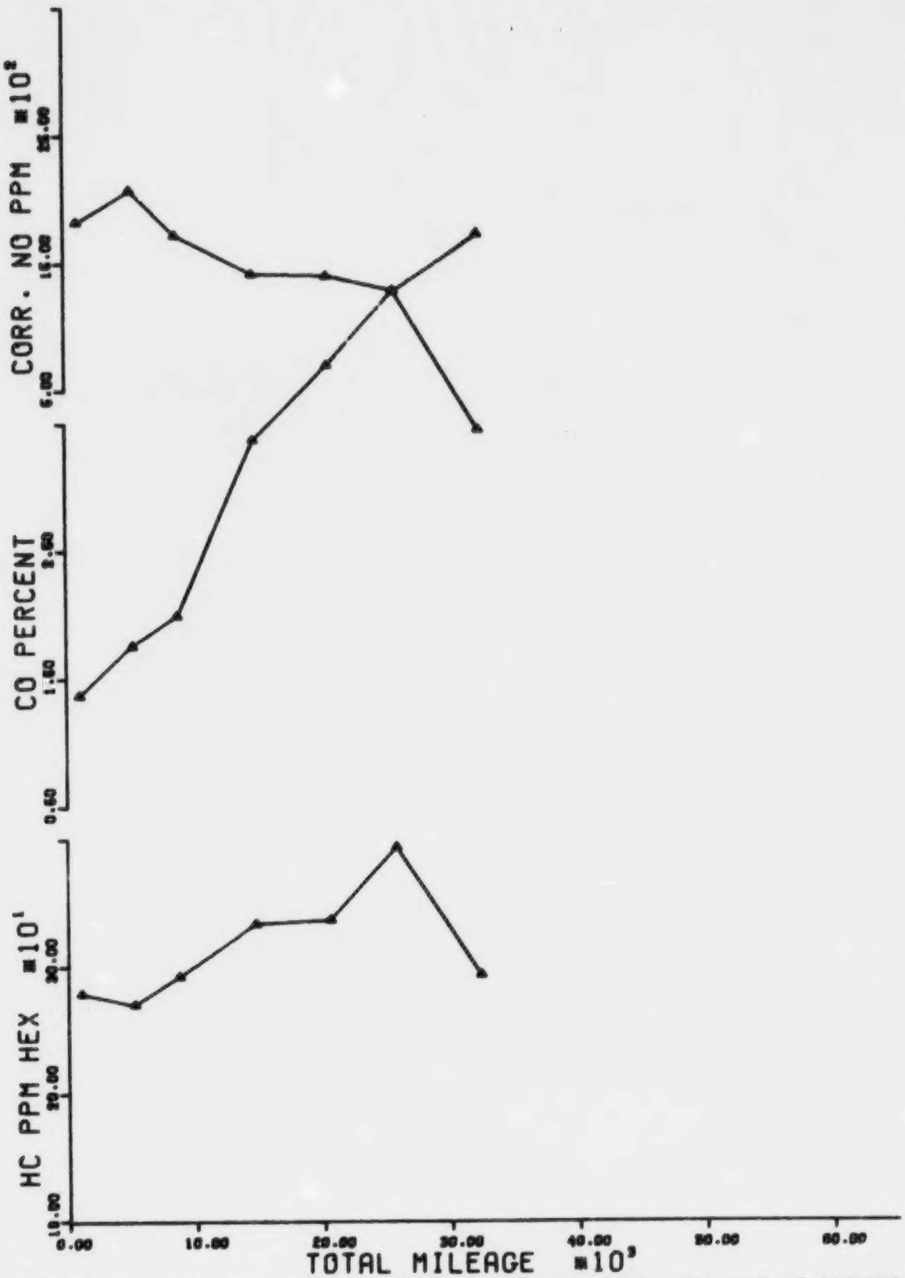


FIGURE E-141. UNIT 141 71 FORD 27500 LB GVW DELIVERY 391 CID V8 ENGINE

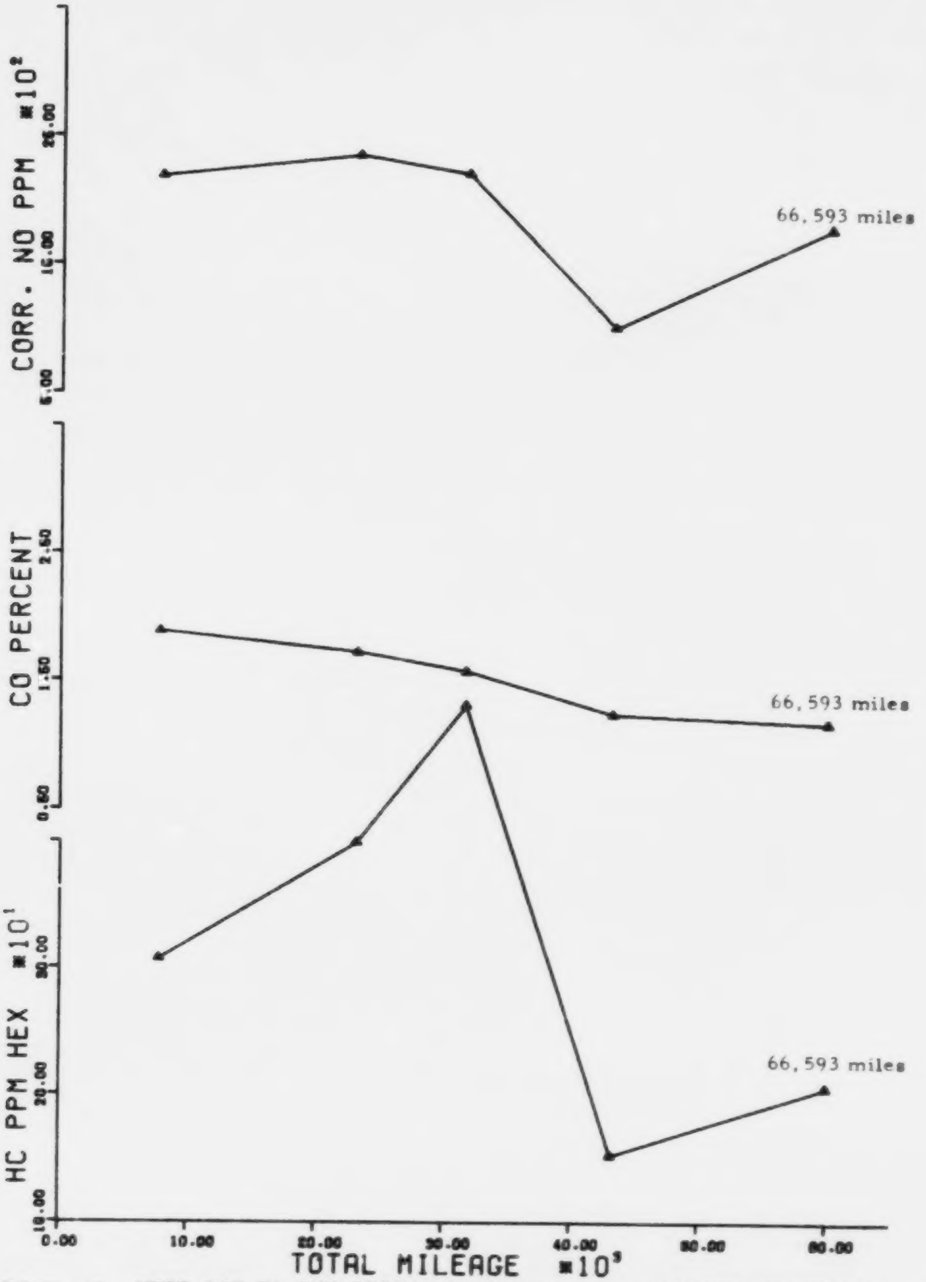


FIGURE E-142. **UNIT 142 71 IHC 32000 LB GVW** RENTAL **478 CID V8 ENGINE**

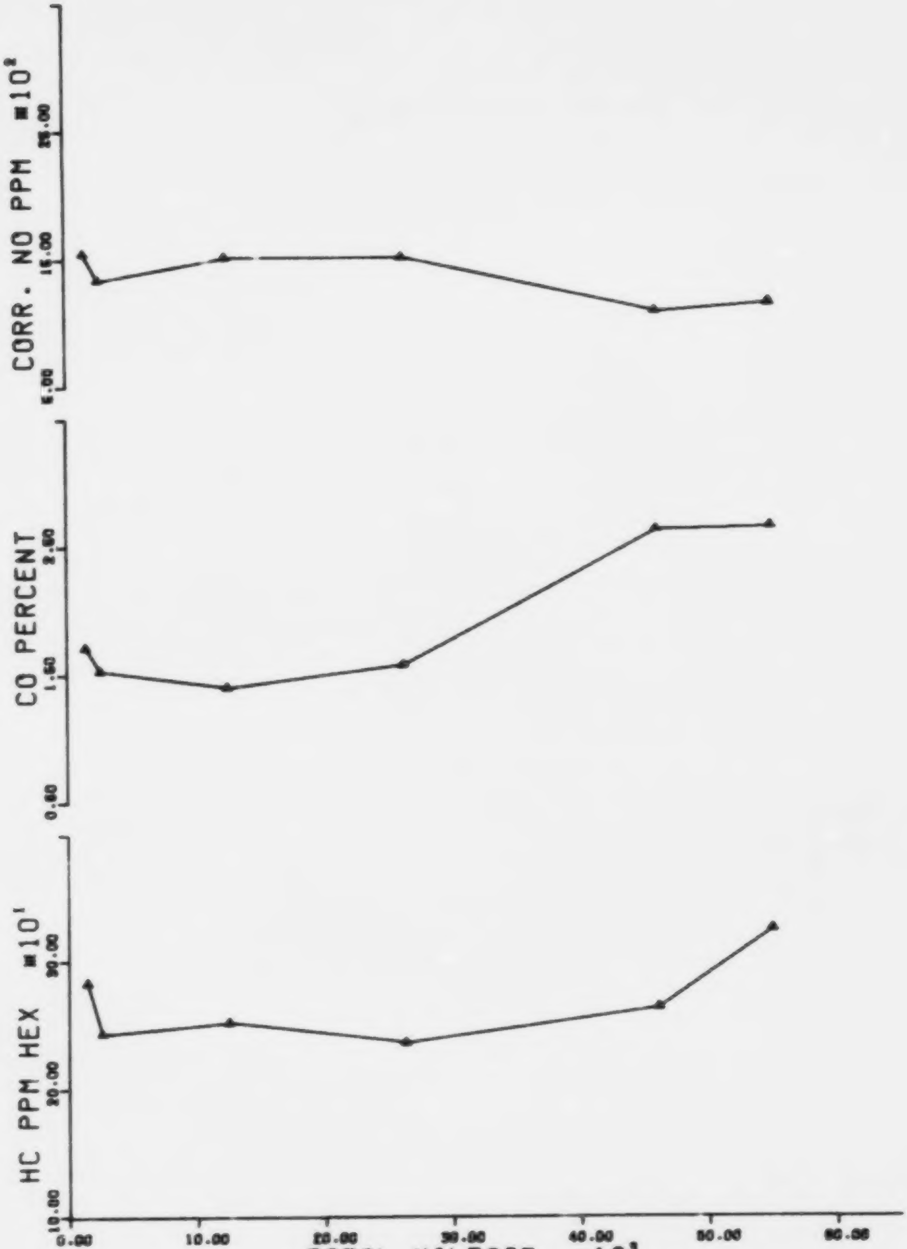


FIGURE E-143. UNIT 143 71 IHC 32000 LB GVW RENTAL 478 CID V8 ENGINE

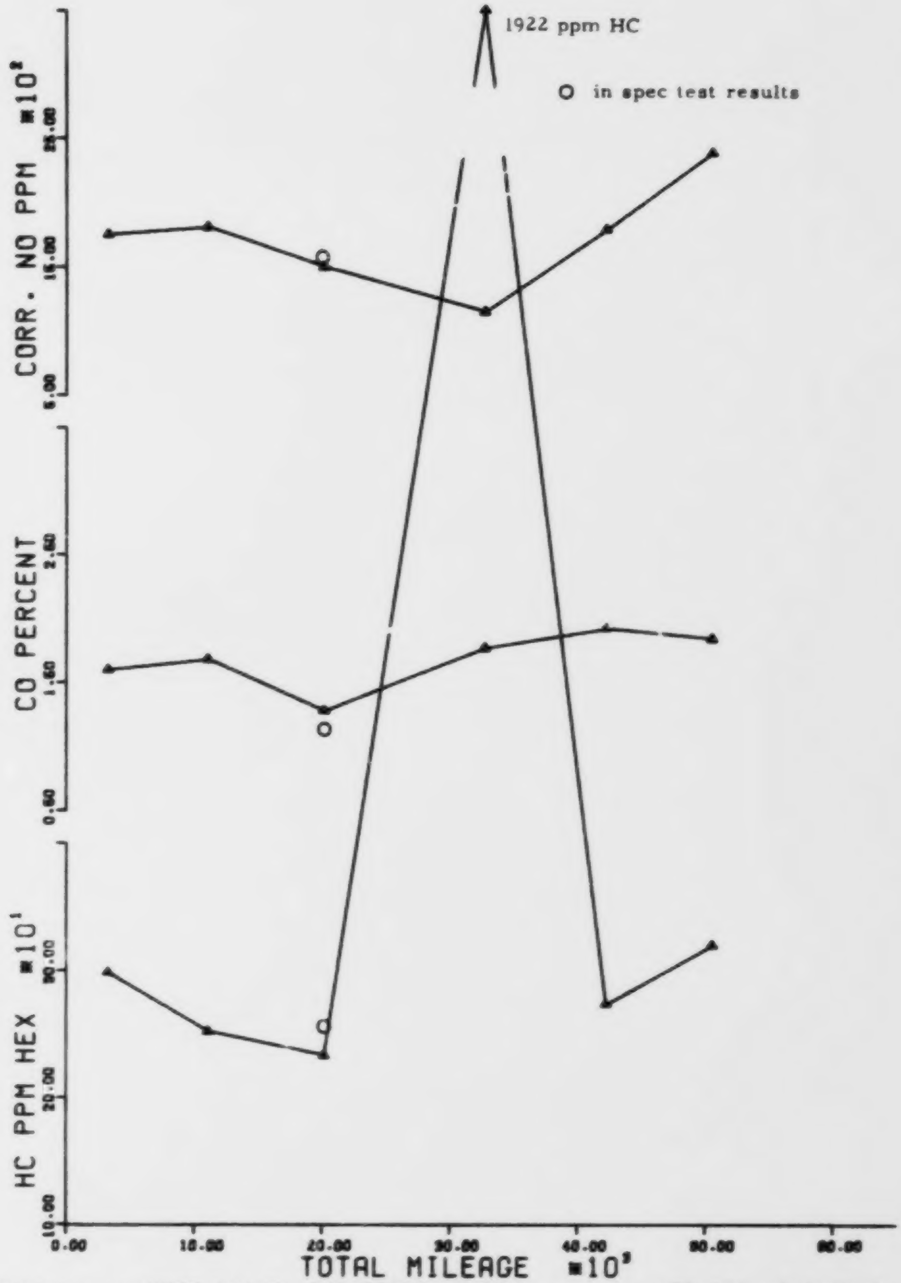


FIGURE E-144. UNIT 144 71 IHC 32000 LB GVW RENTAL 478 CID V8 ENGINE

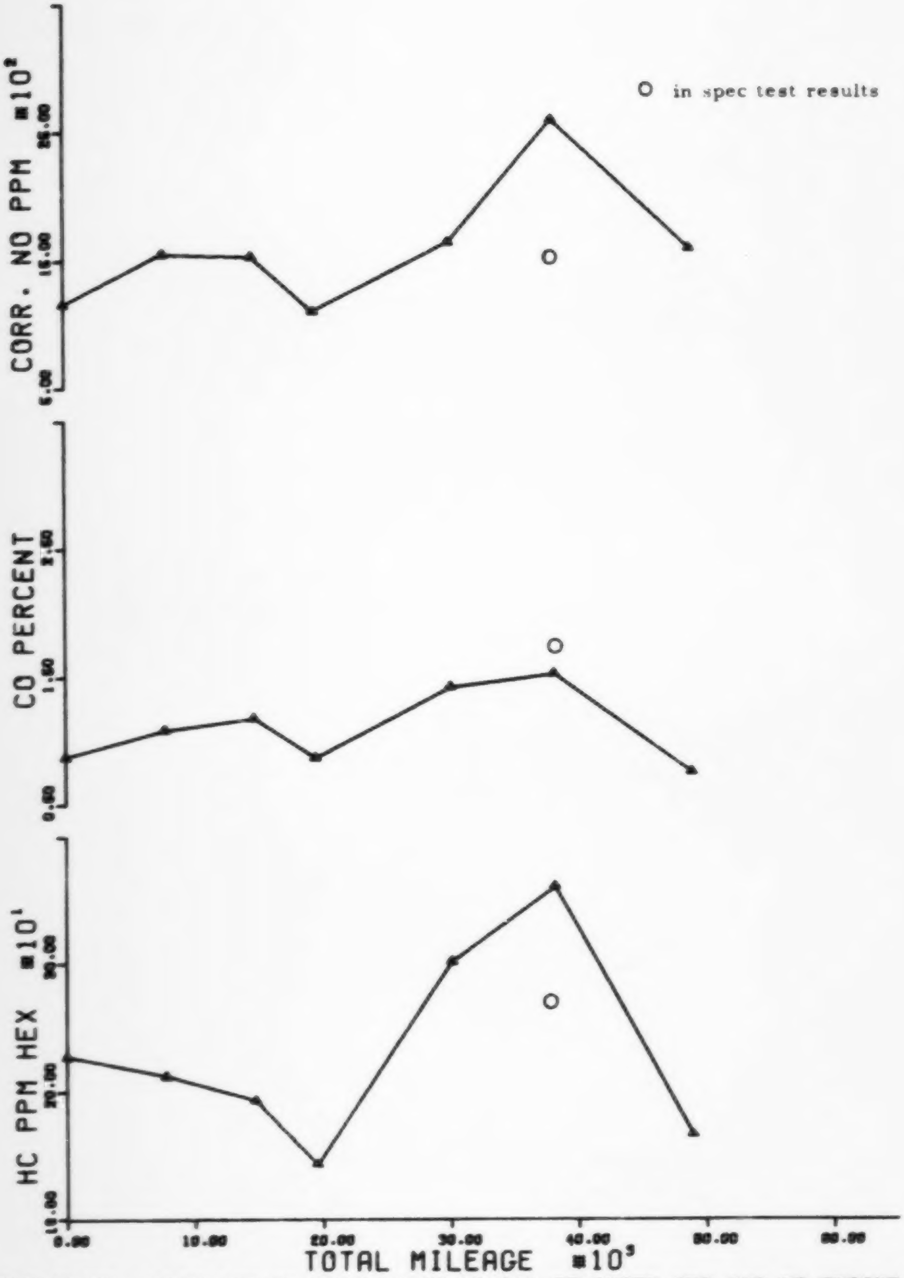


FIGURE E-145. UNIT 145 71 CHEV 24000 LB GVW DELIVERY 350 CID V8 ENGINE

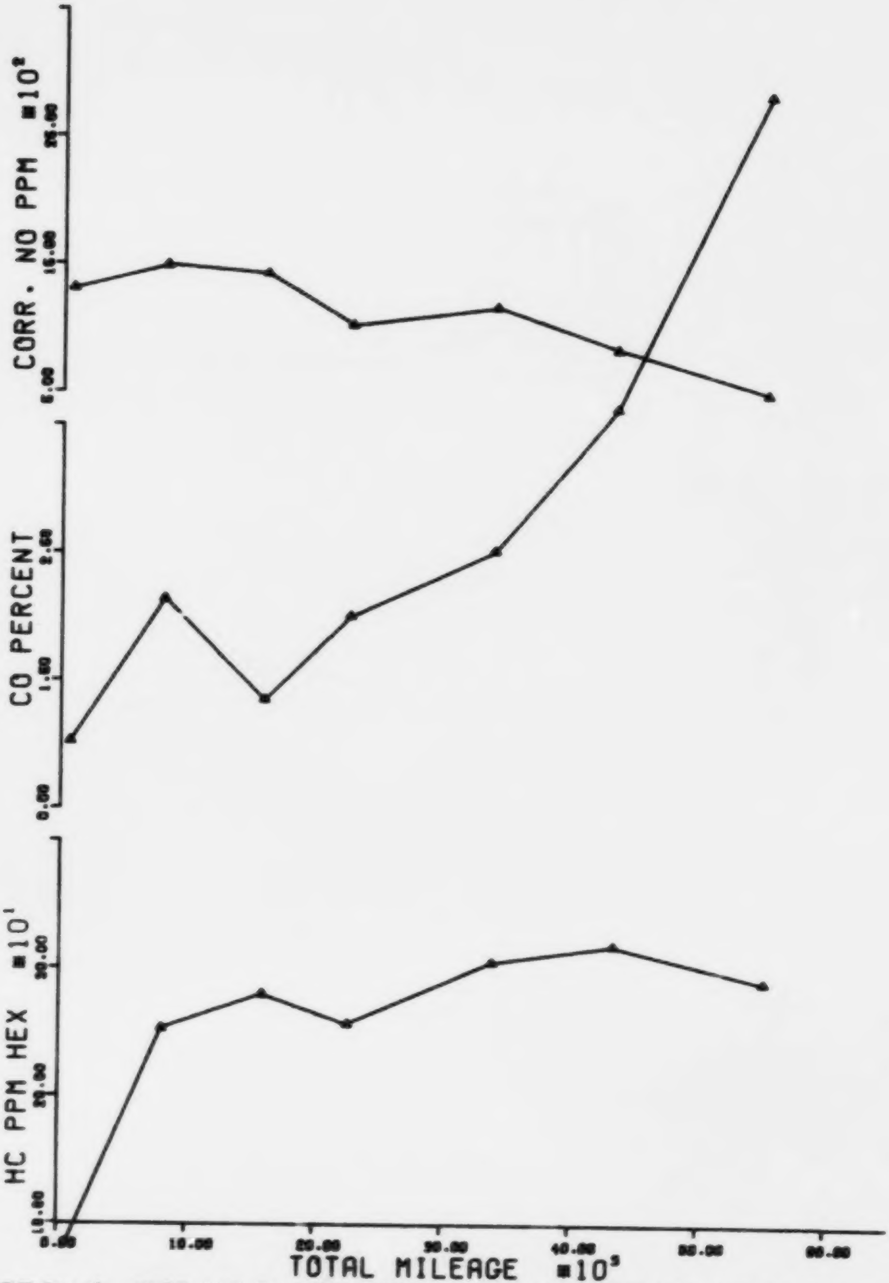


FIGURE E-146. UNIT 146 71 CHEV 24000 LB GVW DELIVERY 350 CID V8 ENGINE

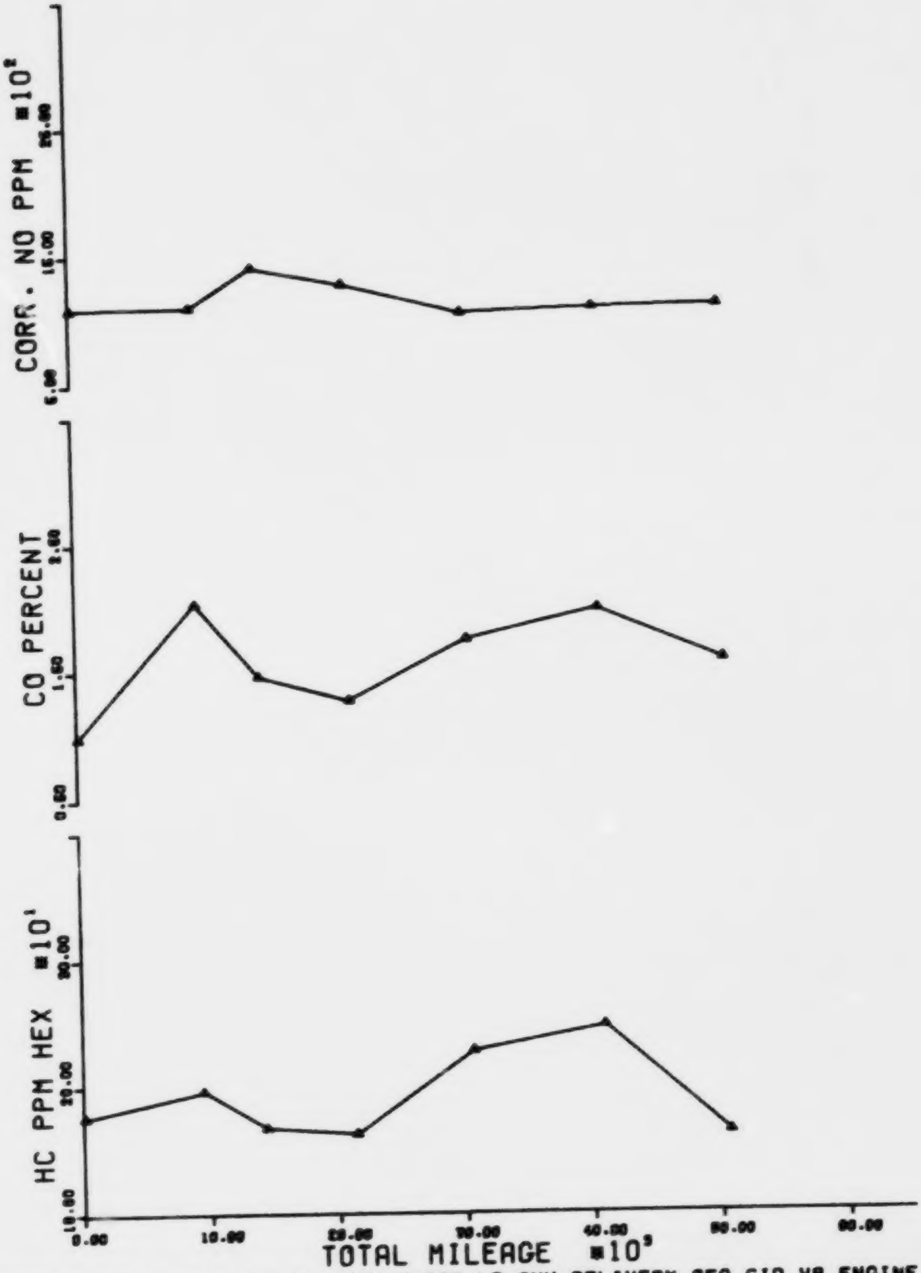


FIGURE E-147. UNIT 147 71 CHEV 24000 LB GVW DELIVERY 350 CID V8 ENGINE

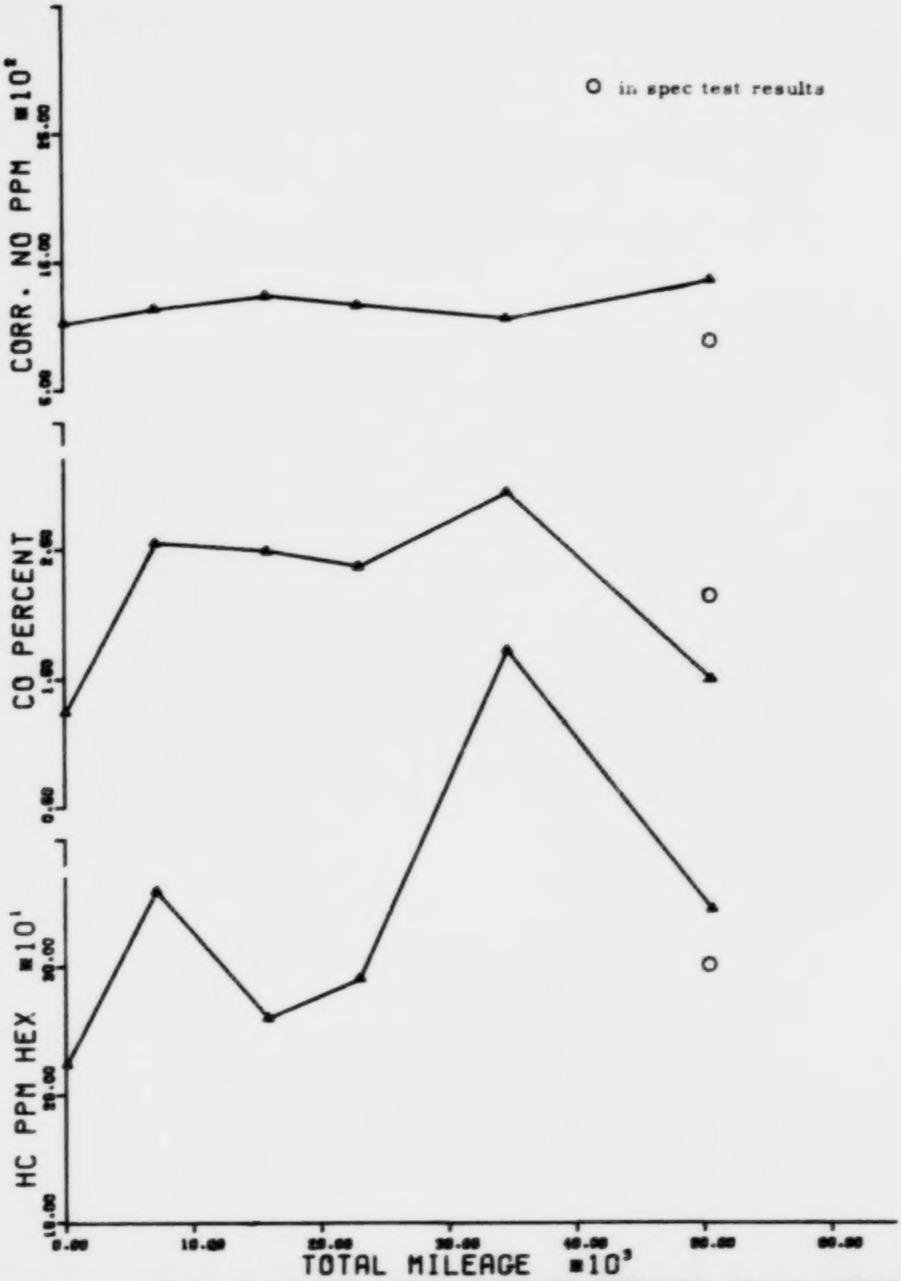


FIGURE E-148. UNIT 148 71 CHEV 24000 LB GVW DELIVERY 350 CID V8 ENGINE

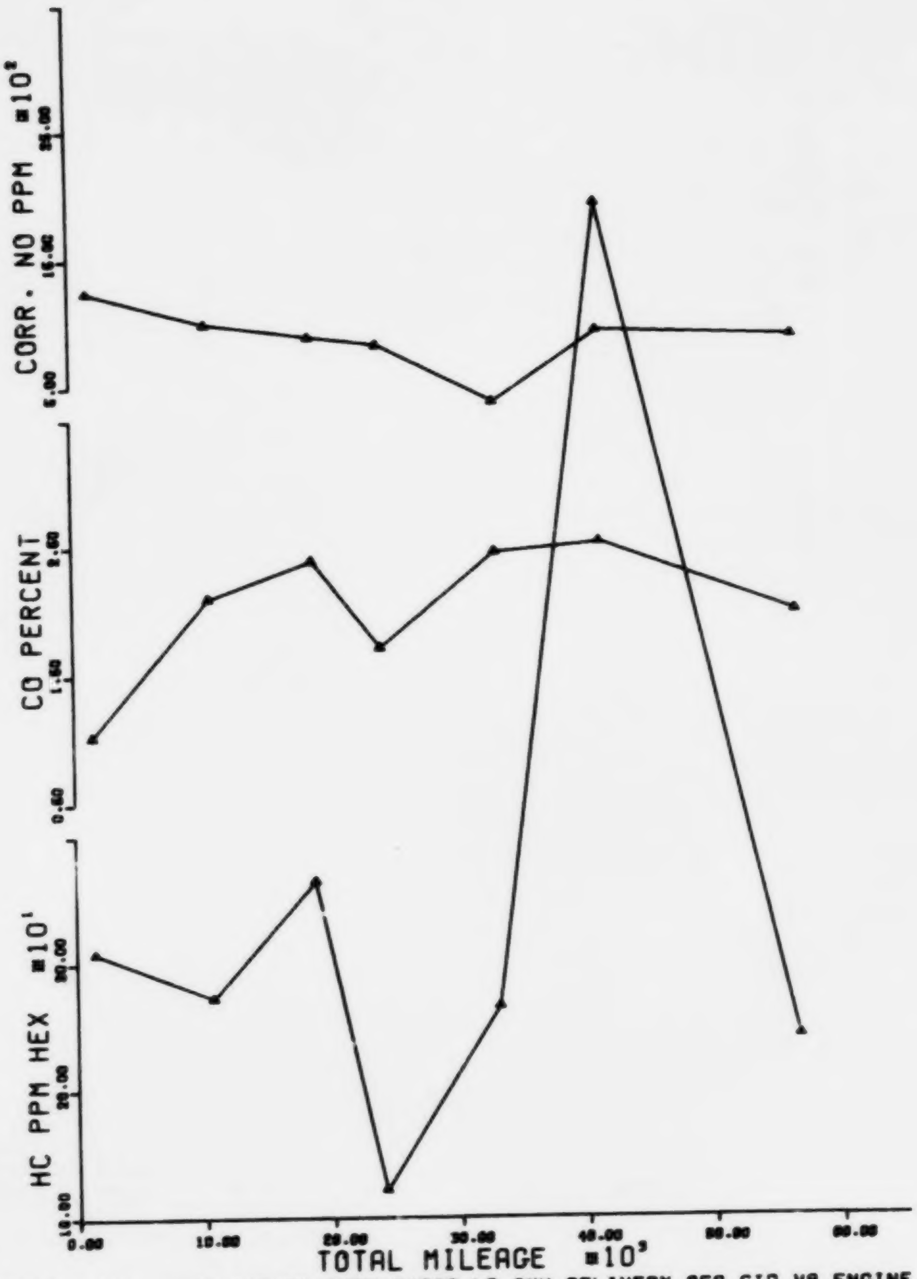


FIGURE E-149. UNIT 149 71 CHEV 24000 LB GVW DELIVERY 350 CID V8 ENGINE

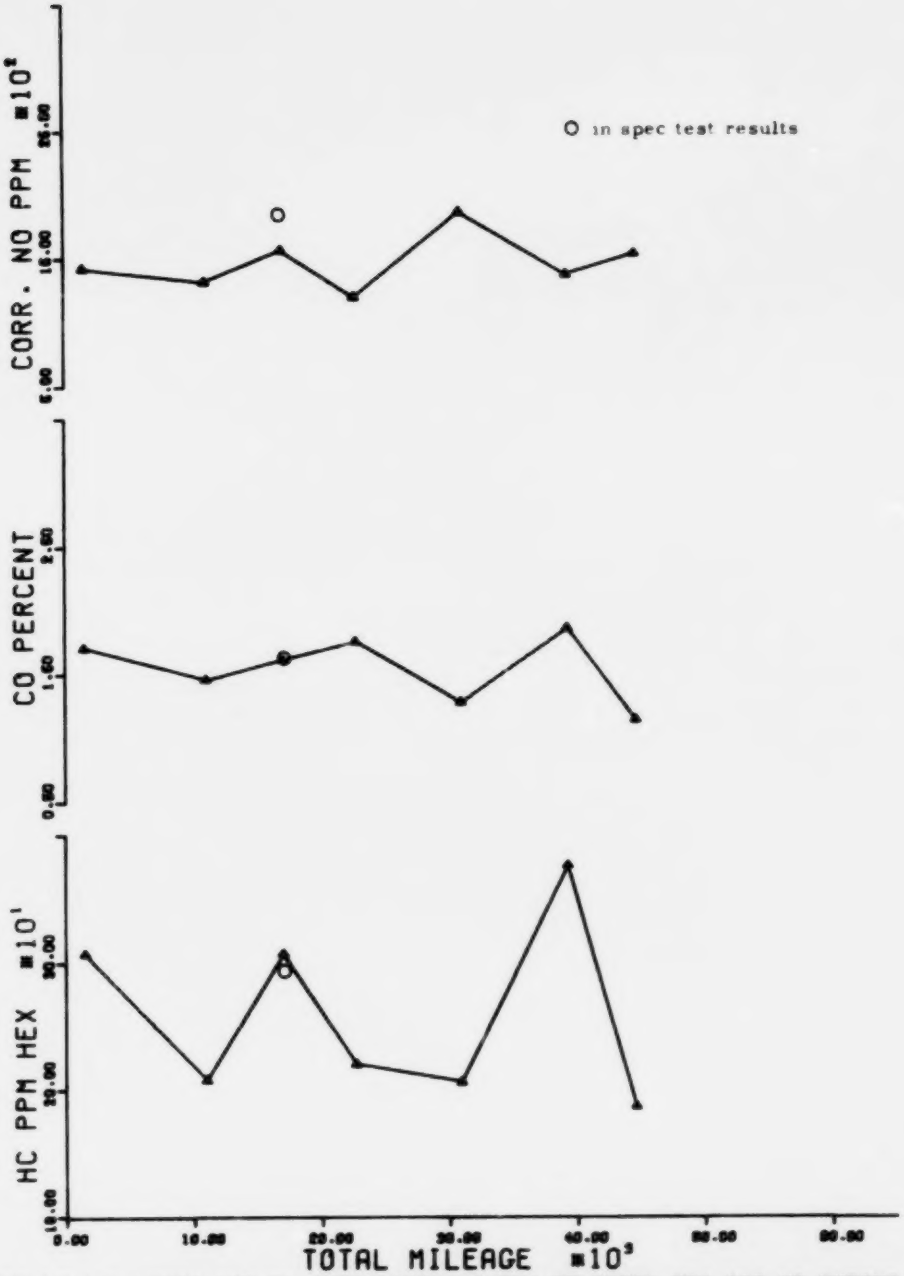


FIGURE E-150. UNIT 150 71 CHEV 24000 LB GVW DELIVERY 350 CID V8 ENGINE

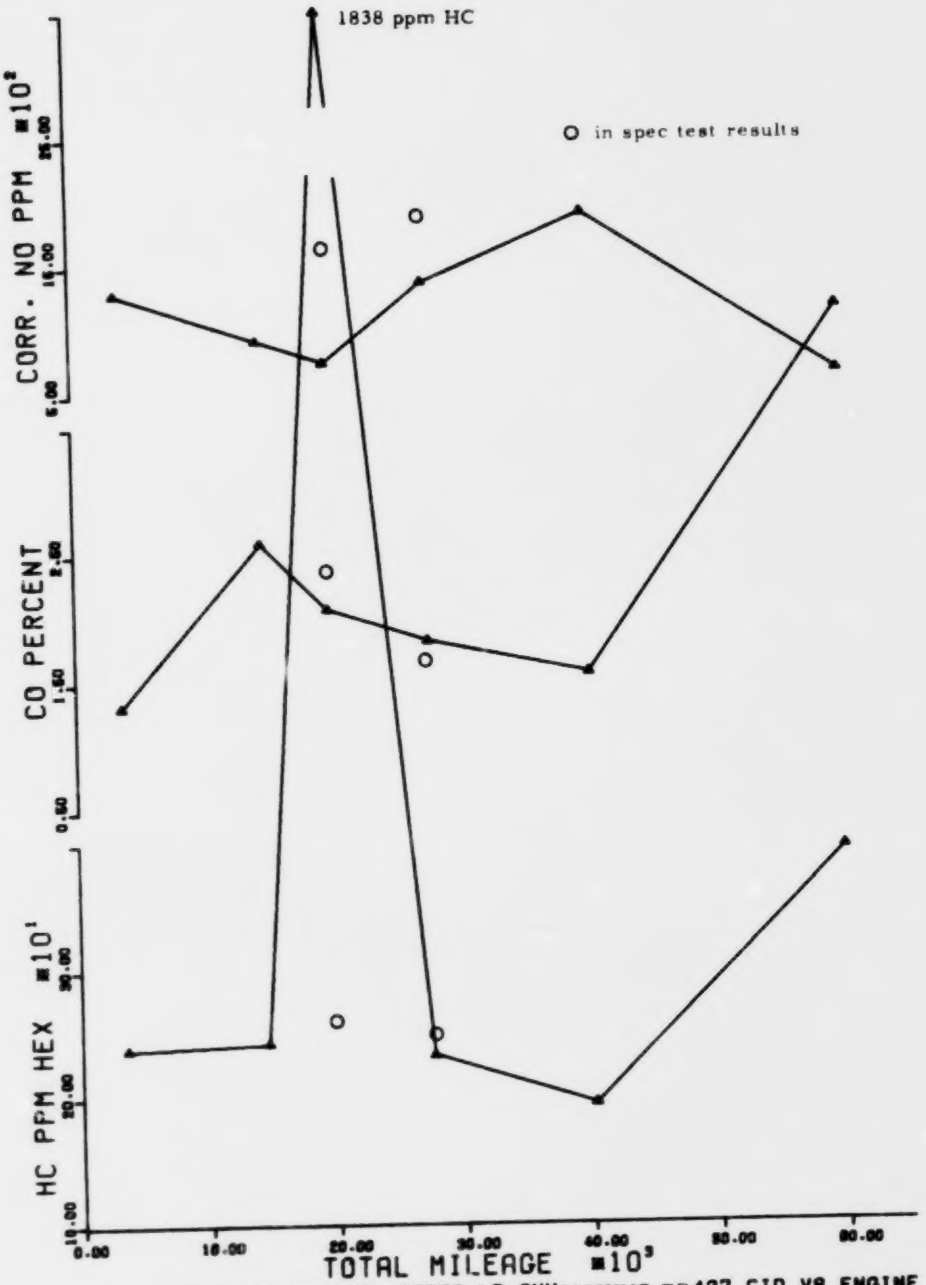


FIGURE E-151. UNIT 151 71 CHEV 32500 LB GVW MOVING TR 427 CID V8 ENGINE

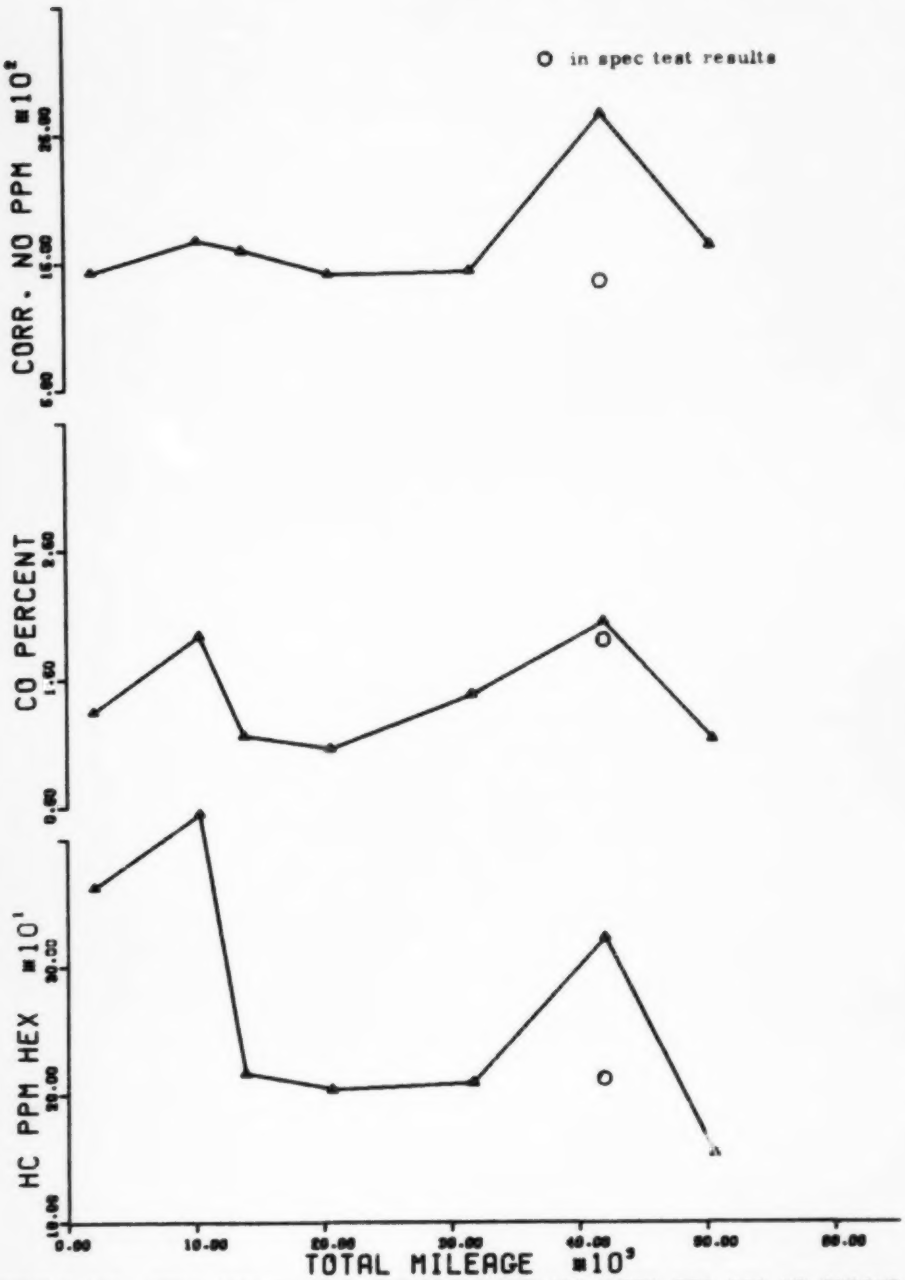


FIGURE E-152. **UNIT 152 71 CHEV 24000 LB GVW DELIVERY 350 CID V8 ENGINE**

APPENDIX F

PLOTS OF EMISSION LEVEL CHANGES WITH MILEAGE BY ENGINE MODEL GROUP

Note: * on computer printout sheets indicates multiplier

APPENDIX F. SAMPLE CALCULATIONS FOR PERCENT CHANGE IN EMISSIONS BY ENGINE GROUP

1. Data for Engine group 1, Chevrolet 250 CID I6 engines, hydrocarbon emissions.

Unit Number	31	32	36	37
Round 1				
Odometer miles	3000	1274	2228	841
HC PPM	266	274	249	263
Round 2				
Odometer miles	9171	3250	3797	4187
HC PPM	260	284	285	294
Round 3				
Odometer miles	14823	6022	7096	6459
HC PPM	222	239	293	284
Round 4				
Odometer miles	26720	11450	11213	12163
HC PPM	255	223	252	272
Round 5				
Odometer miles	37406	16329	15724	17823
HC PPM	214	230	371	261
Round 6				
Odometer miles	48359	21358	19000	23420
HC PPM	228	295	266	229
Round 7				
Odometer miles	59460	26246	22180	wrecked
HC PPM	308	277	290	

2. First, the highest round 1 odometer mileage is chosen as the base mileage. In this example the base mileage is 3000 miles, the initial mileage for unit 31.
3. Next, the emission level at 3000 miles is calculated for the remaining units as follows:
   - (a) Determine when the base mileage is reached for each unit. In this example 3000 miles is reached between round 1 and round 2 inspections for all trucks
   - (b) Determine the equation for the line between the HC levels on either side of the base mileage.

     i.e., HC = (A x Mileage) + B

For unit 32: $A = \frac{(284-274)}{(3250-1274)} = .00506$

$B = 274 - (.00506 \times 1274) = 267.6$

at 3000 miles $HC = (.00506 \times 3000) + 267.6$
$HC = 283$

For unit 36: $A = \frac{(285-249)}{(3797-2228)} = .0229$

$B = 249 - (.0229 \times 2228) = 197.9$

at 3000 miles $HC = (.0229 \times 3000) + 197.9$
$HC = 267$

For unit 37: $A = \frac{(294-263)}{(4187-841)} = .00926$

$B = 263 - (.00926 \times 841) = 255.2$

at 3000 miles $HC = (.00926 \times 3000) + 255.2$
$HC = 283$

4. At the base mileage, the interpolated base emission level is now available for all units. For this example, at 3000 miles the base HC level is:

Unit	Base HC ppm
31	266
32	283
36	267
37	283

5. Using each unit's base emission level the percent change from the base emission level is calculated for the test results from each round.

(a) Unit 31

$$\text{Round } 1 = \frac{266-266}{266} \times 100 = 0\%$$

$$\text{Round } 2 = \frac{260-266}{266} \times 100 = -2.3\%$$

$$\text{Round } 3 = \frac{222-266}{266} \times 100 = -16.5\%$$

$$\text{Round } 4 = \frac{255-266}{266} \times 100 = -4.1\%$$

$$\text{Round } 5 = \frac{214-266}{266} \times 100 = -19.6\%$$

$$\text{Round } 6 = \frac{228-266}{266} \times 100 = -14.3\%$$

$$\text{Round } 7 = \frac{308-266}{266} \times 100 = +15.8\%$$

(b) Unit 32

$$\text{Round } 1 = \frac{274-283}{283} \times 100 = -3.2\%$$

$$\text{Round } 2 = \frac{284-283}{283} \times 100 = 0.4\%$$

$$\text{Round } 3 = \frac{239-283}{283} \times 100 = -15.5\%$$

$$\text{Round } 4 = \frac{223-283}{283} \times 100 = -21.2\%$$

$$\text{Round } 5 = \frac{230-283}{283} \times 100 = -18.7\%$$

$$\text{Round } 6 = \frac{295-283}{283} \times 100 = +4.2\%$$

$$\text{Round } 7 = \frac{277-283}{283} \times 100 = -2.1\%$$

(c) Unit 36

$$\text{Round 1} = \frac{249-267}{267} = -6.7$$

$$\text{Round 2} = \frac{285-267}{267} = +6.7$$

$$\text{Round 3} = \frac{293-267}{267} = +9.7$$

$$\text{Round 4} = \frac{252-267}{267} = -5.6$$

$$\text{Round 5} = \frac{371-267}{267} = +39.0$$

$$\text{Round 6} = \frac{266-267}{267} = -0.4$$

$$\text{Round 7} = \frac{290-267}{267} = +8.6$$

(d) Unit 37

$$\text{Round 1} = \frac{263-283}{283} = -7.1$$

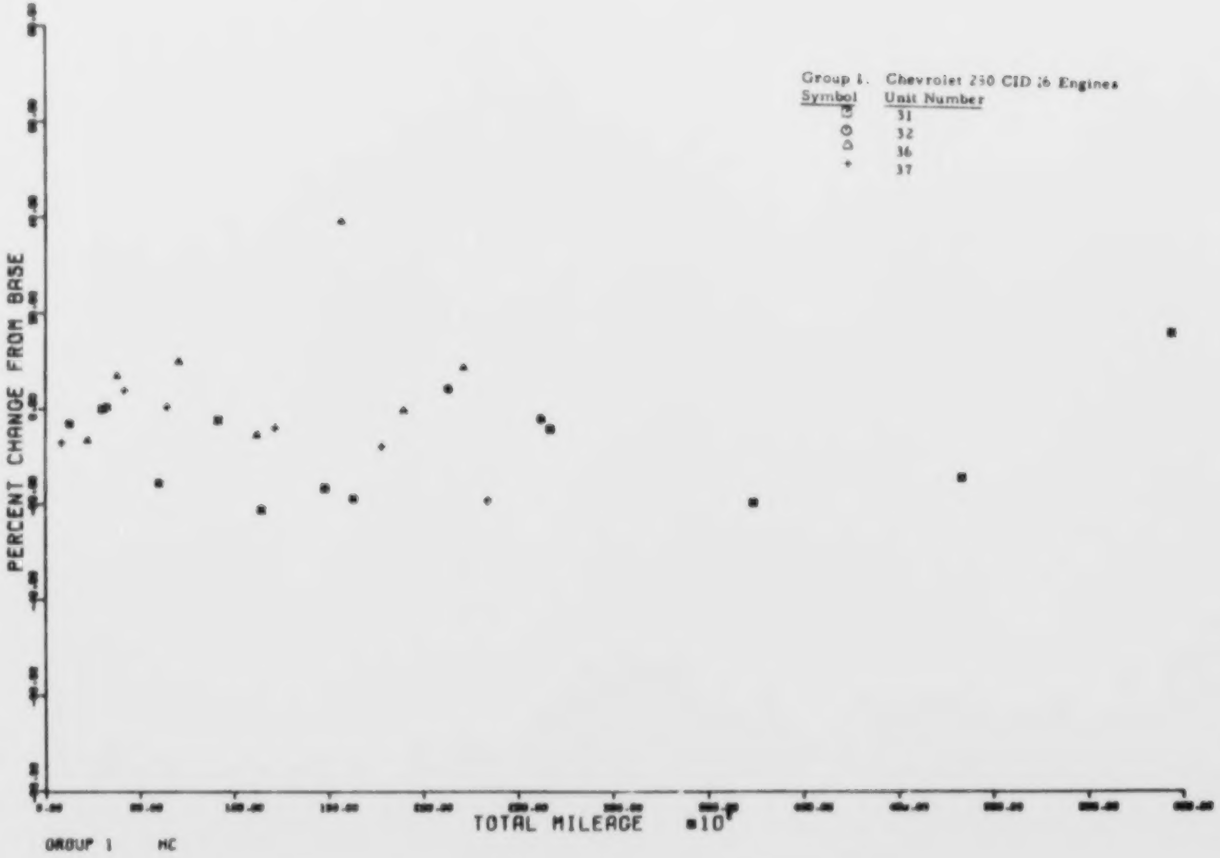
$$\text{Round 2} = \frac{294-283}{283} = +3.9$$

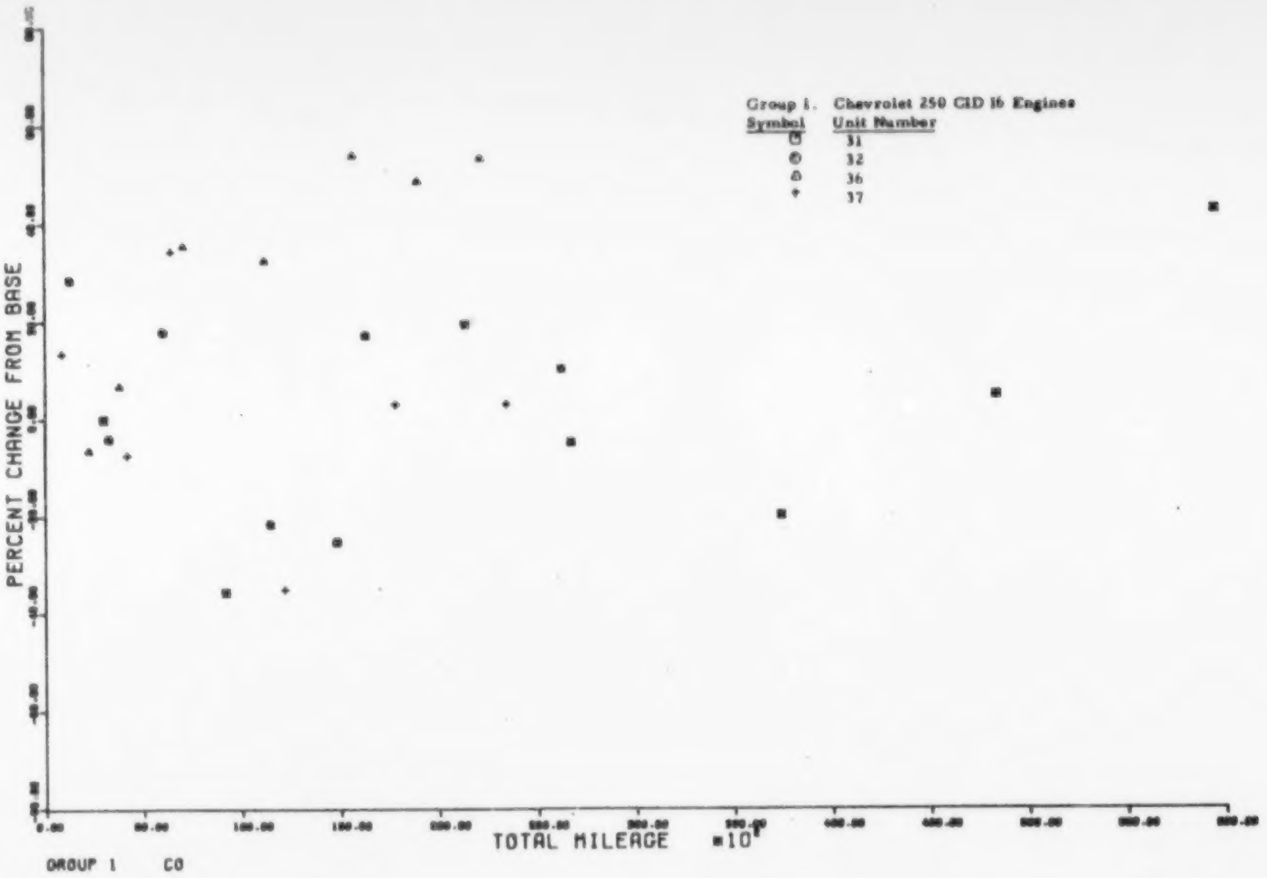
$$\text{Round 3} = \frac{284-283}{283} = +0.4$$

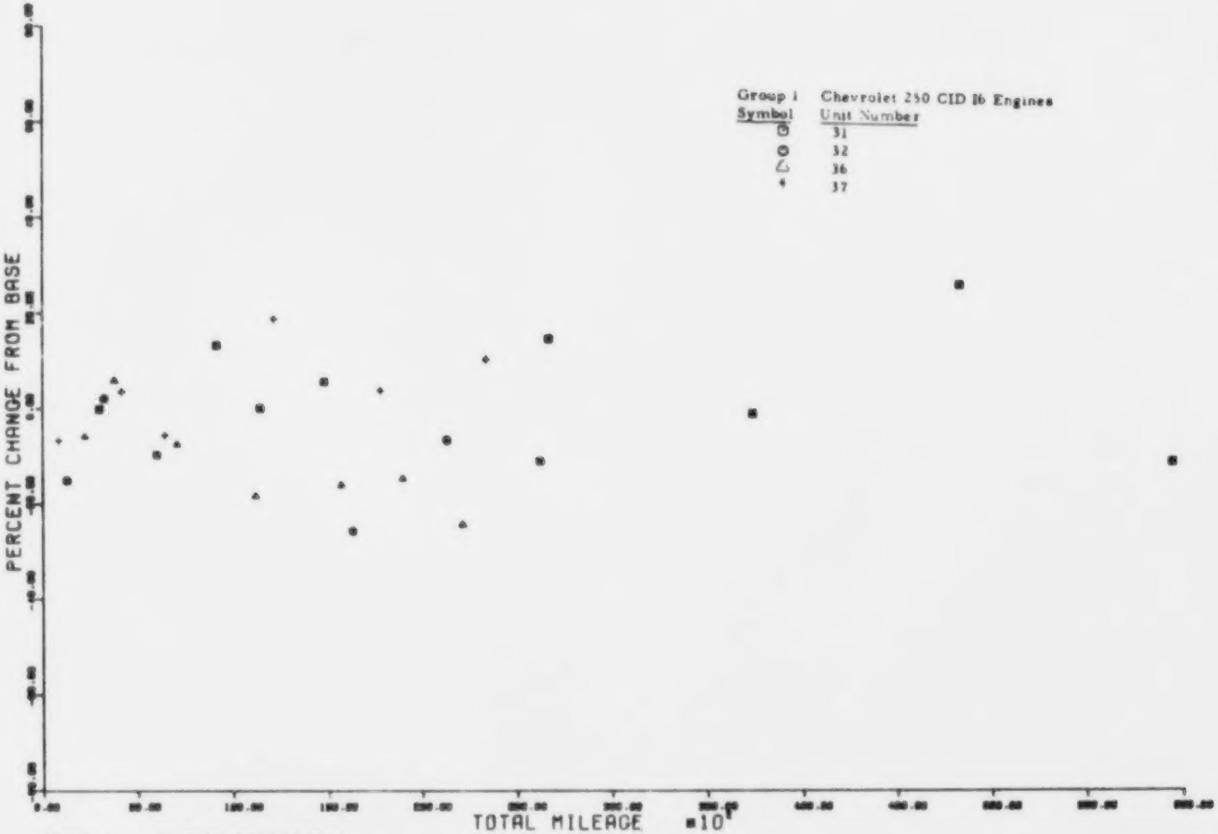
$$\text{Round 4} = \frac{272-283}{283} = -3.9$$

$$\text{Round 5} = \frac{261-283}{283} = -7.8$$

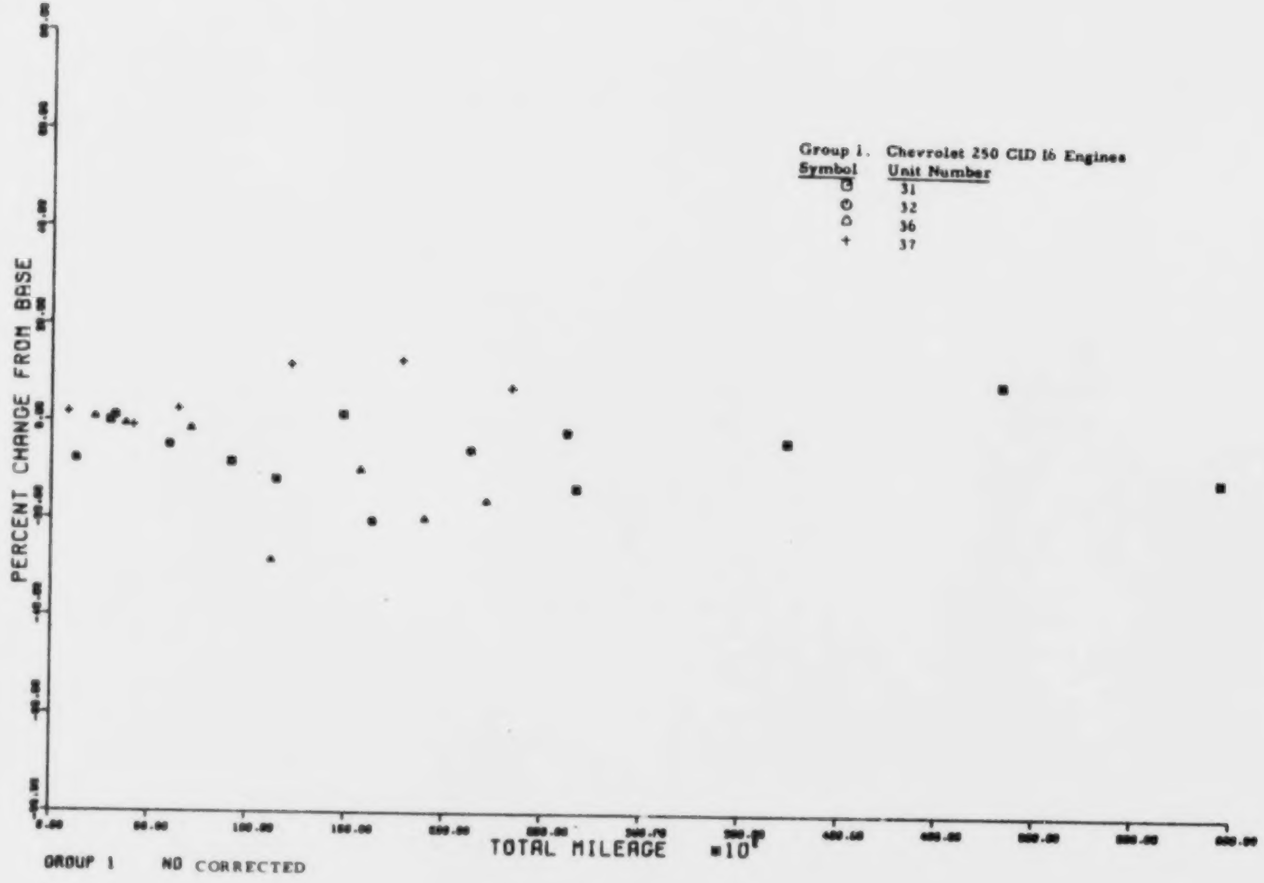
$$\text{Round 6} = \frac{229-283}{283} = -19.1$$

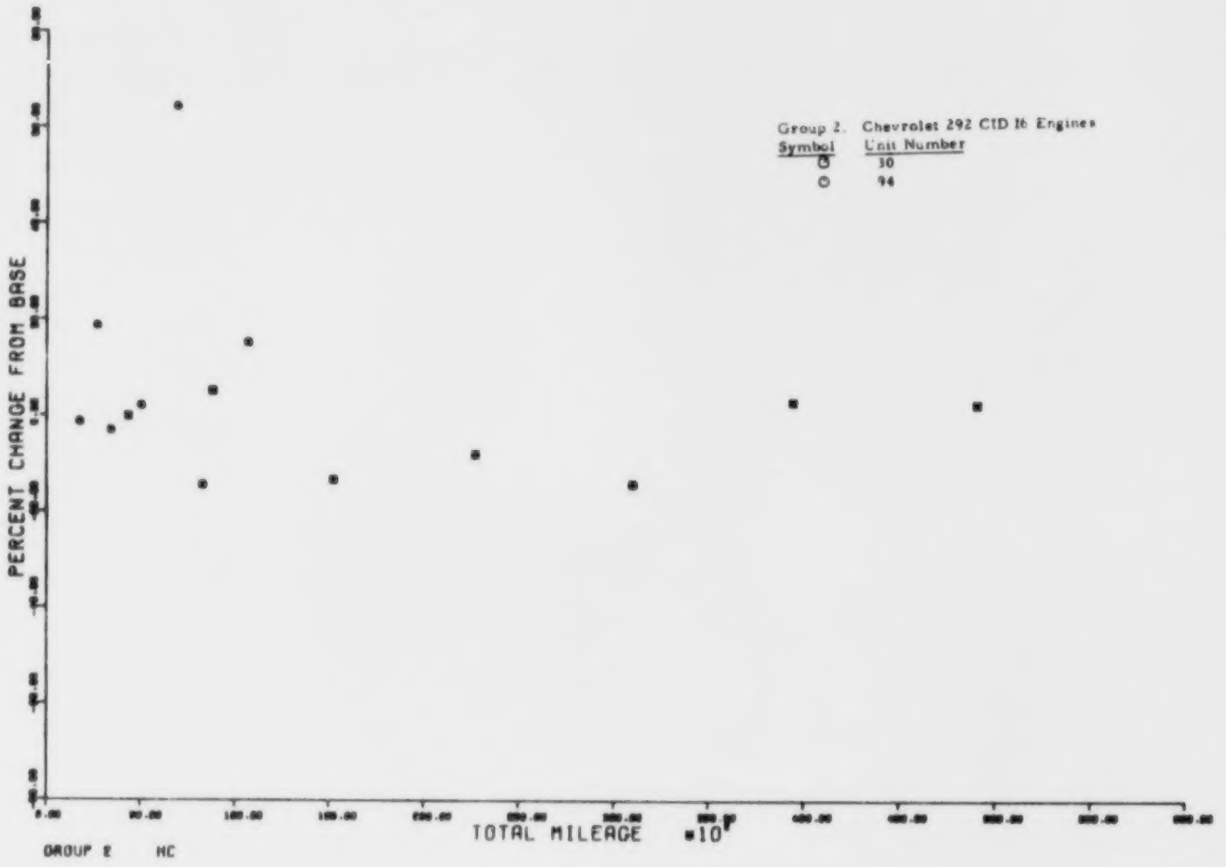

Group 1. Chevrolet 250 CID :6 Engines
Symbol Unit Number
31
32
36
37
PERCENT CHANGE FROM BASE
TOTAL MILEAGE *10
GROUP 1 HC

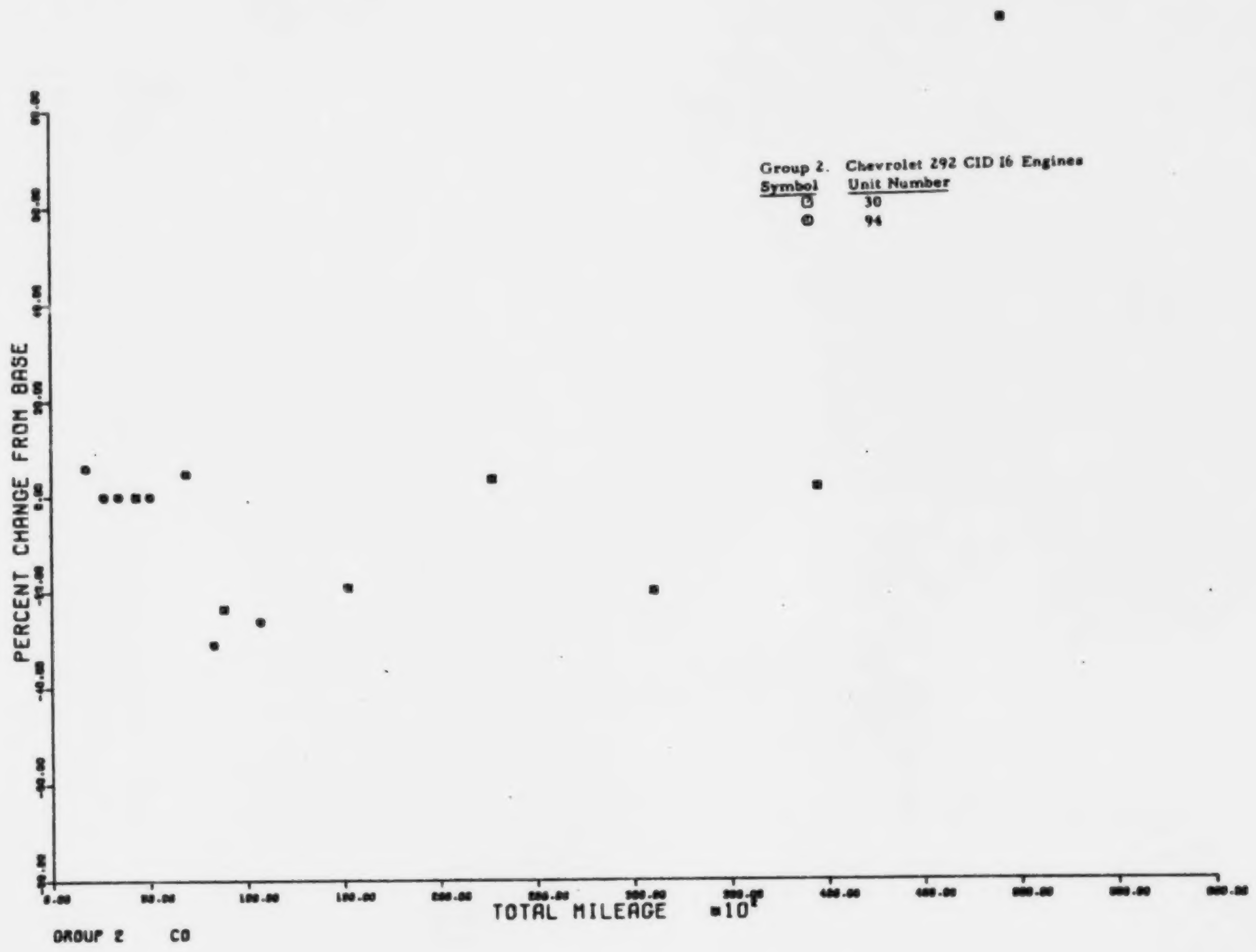

Group I. Chevrolet 250 CID I6 Engines
Symbol
Unit Number
□ 31
⊙ 32
△ 36
+ 37
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE *10
0.00
100.00
200.00
GROUP I CO

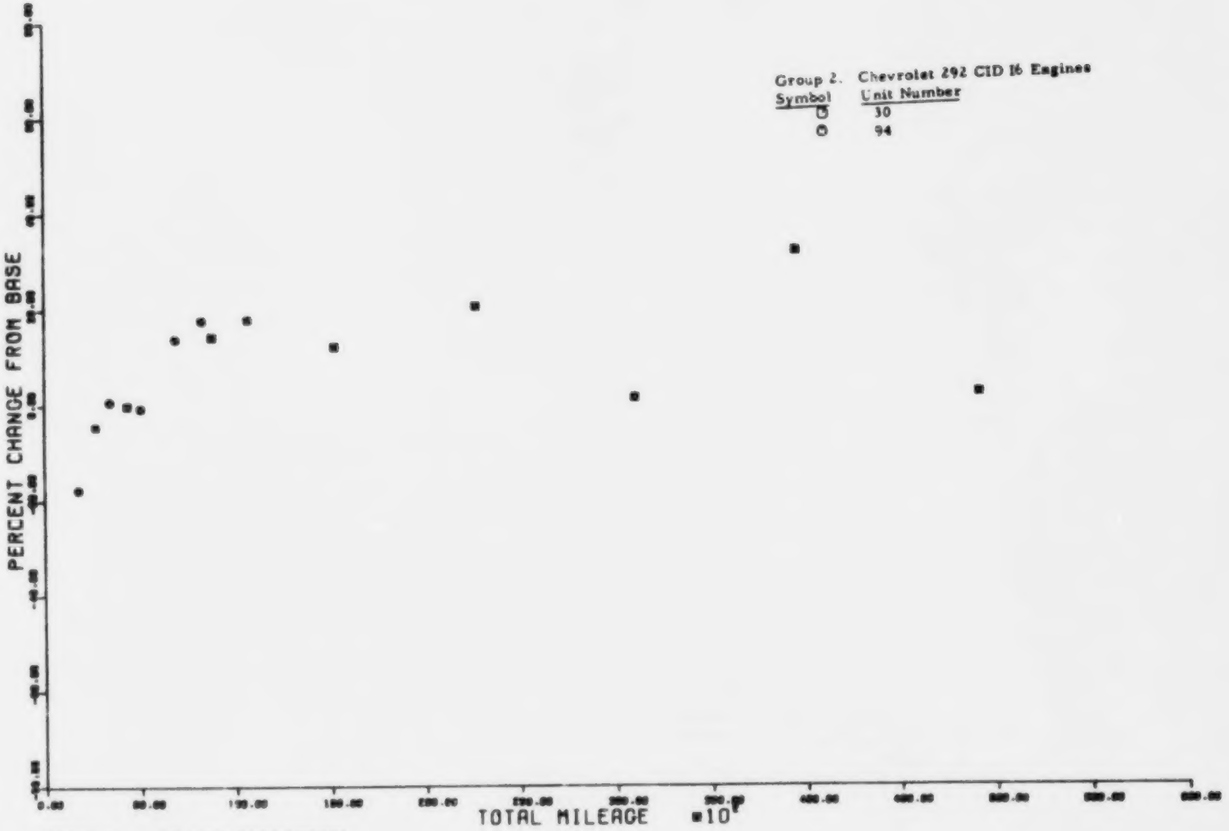


GROUP 1 NO (NOT CORRECTED)

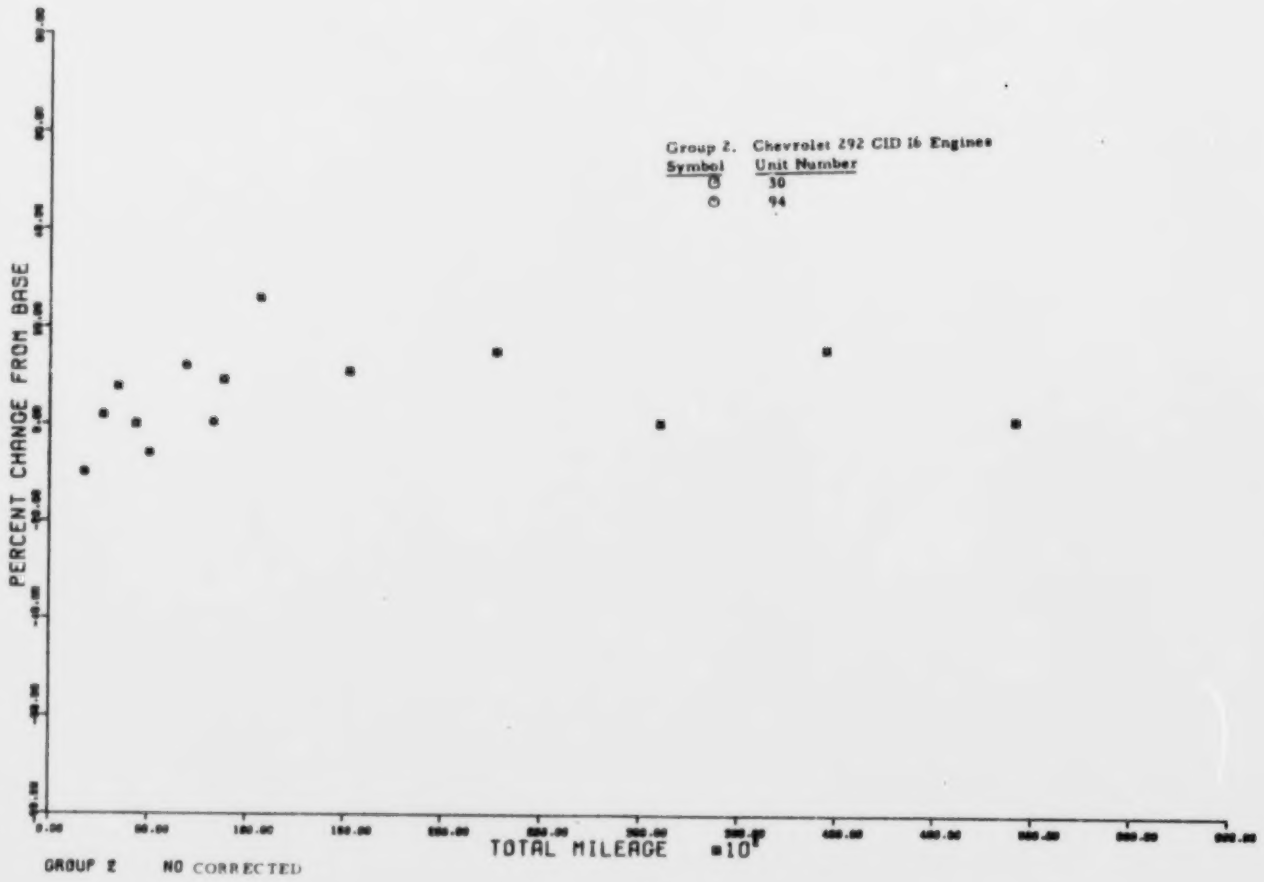

Group 1. Chevrolet 250 CID I6 Engines
Symbol
Unit Number
31
32
36
+ 37
PERCENT CHANGE FROM BASE
TOTAL MILEAGE *10
GROUP 1 NO CORRECTED

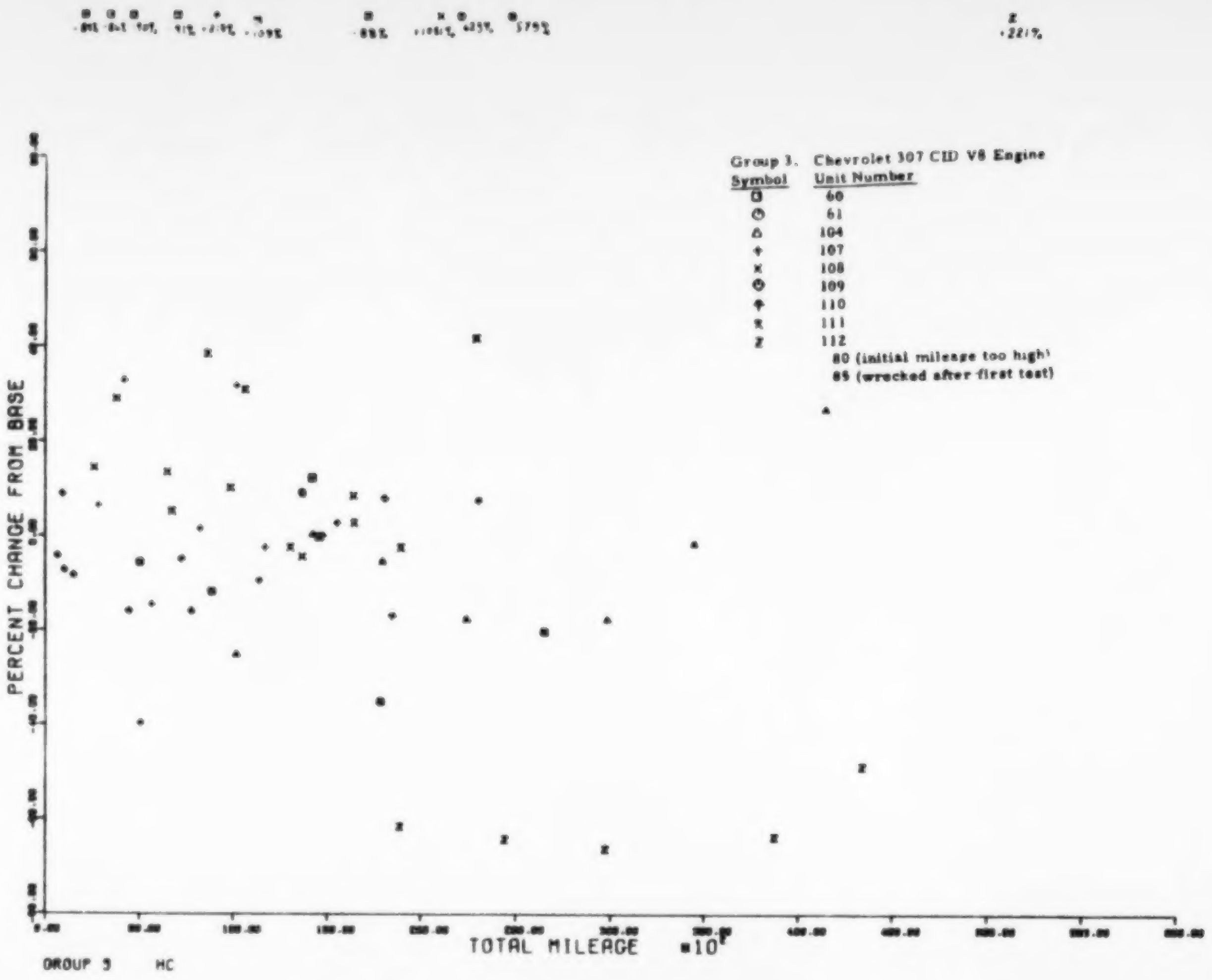
Group 2. Chevrolet 292 CID I6 Engines
Symbol
Unit Number
30
94
PERCENT CHANGE FROM BASE
TOTAL MILEAGE
*10
0.00
GROUP 2
HC

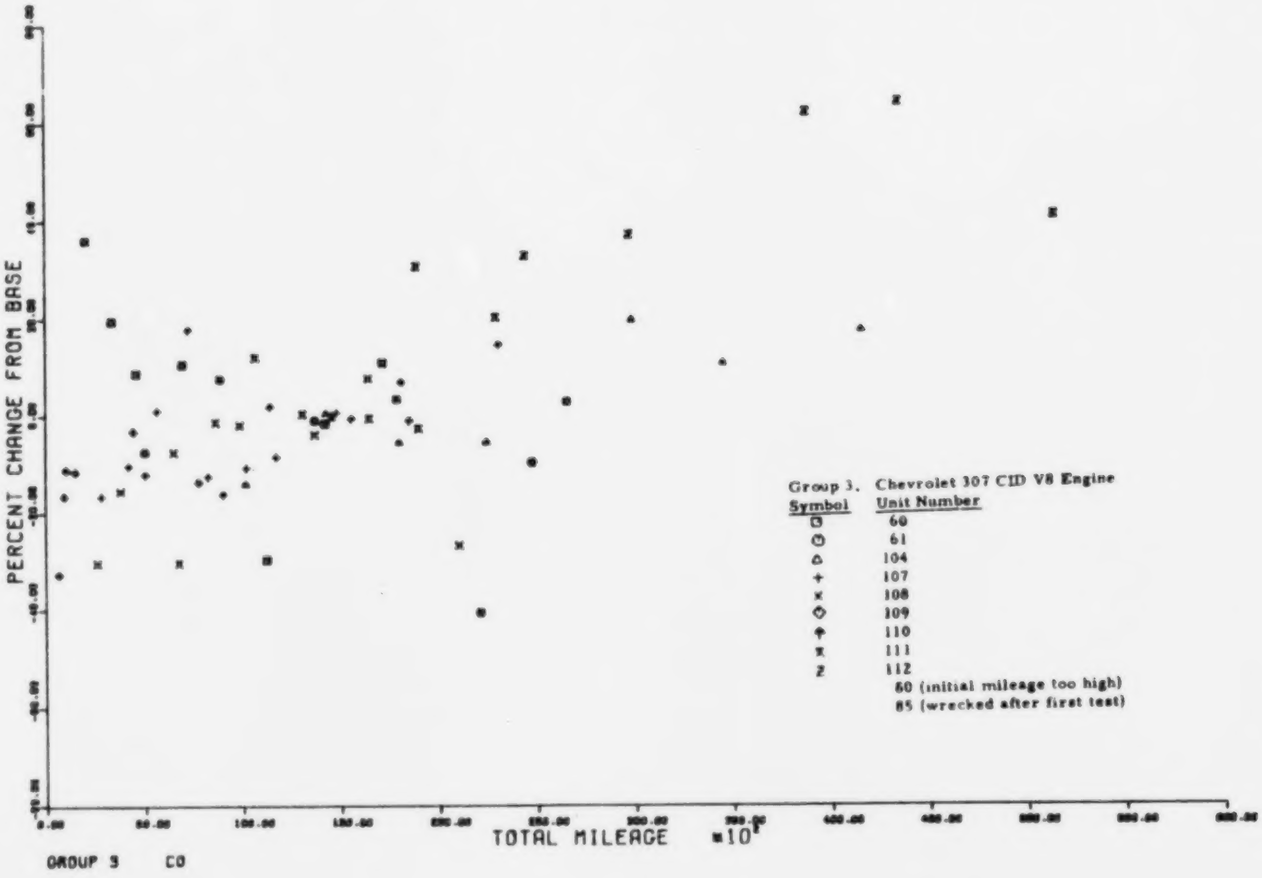

Group 2. Chevrolet 292 CID I6 Engines
Symbol Unit Number
30
94
PERCENT CHANGE FROM BASE
TOTAL MILEAGE ×10
GROUP 2 CO



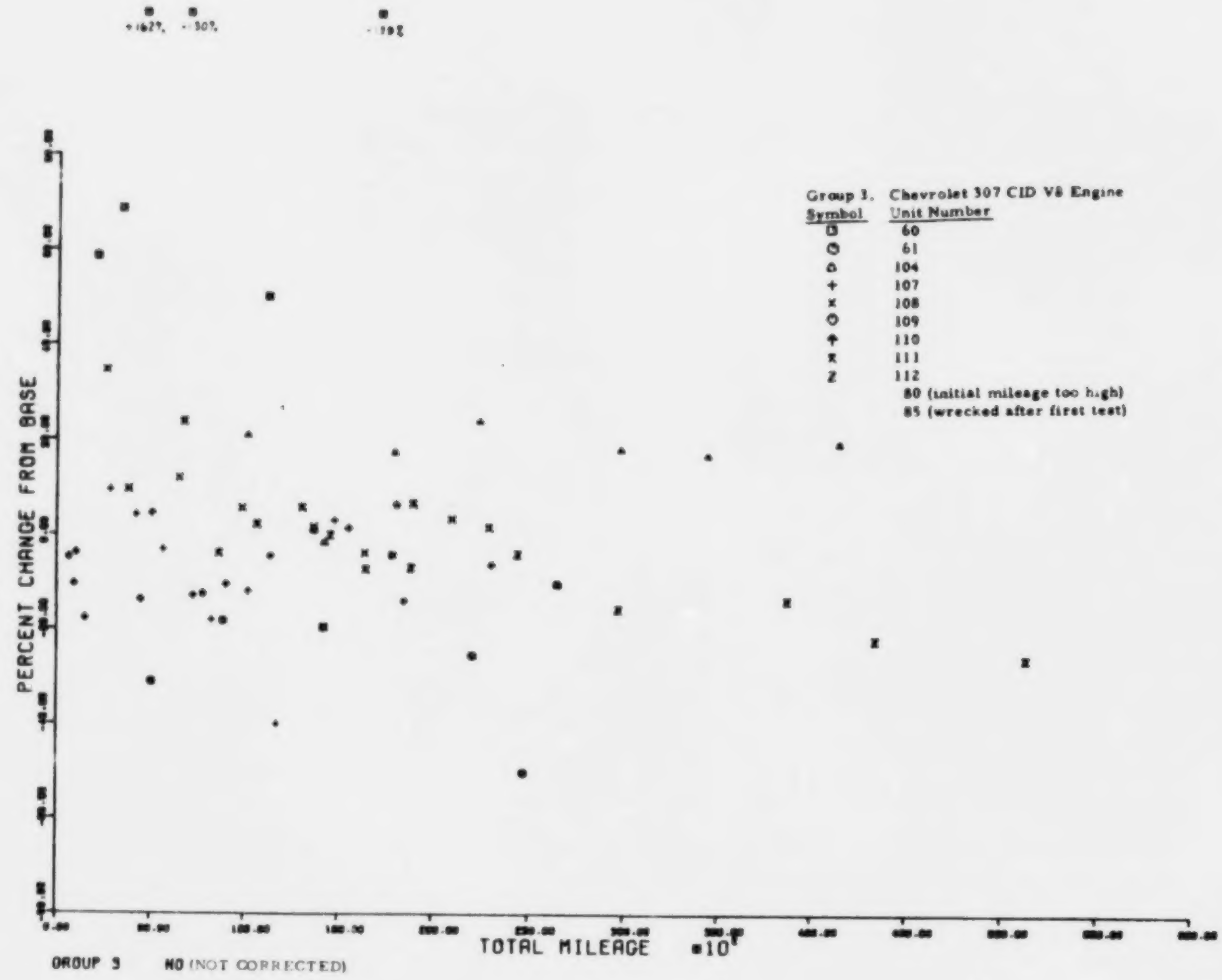
GROUP 2 NO (NOT CORRECTED)

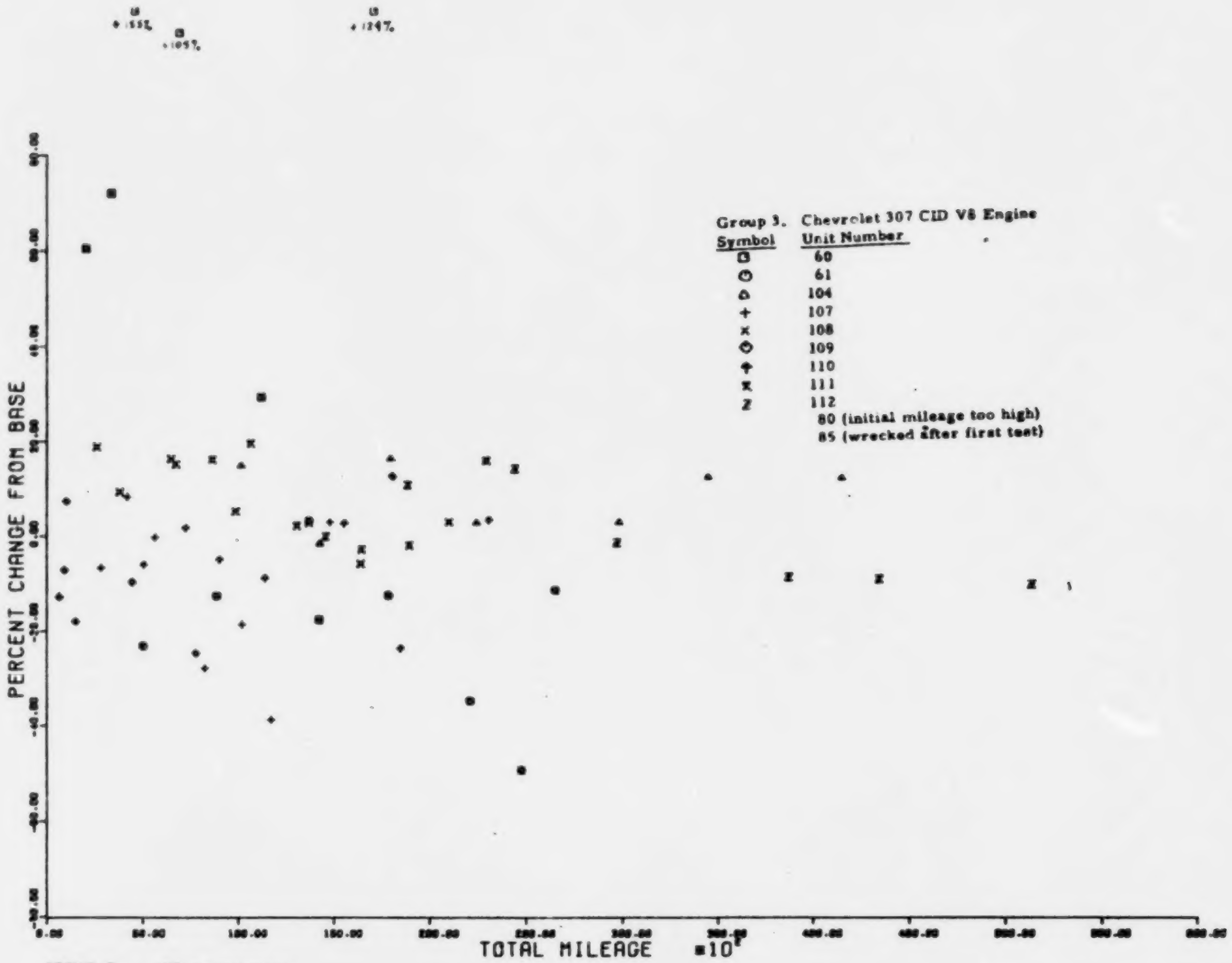

Group 2. Chevrolet 292 CID I6 Engines
Symbol Unit Number
30
94
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE *10
0.00
100.00
GROUP 2 NO CORRECTED


579%
+221%
Group 3. Chevrolet 307 CID V8 Engine
Symbol Unit Number
▢ 60
○ 61
△ 104
+ 107
× 108
⊙ 109
✦ 110
ꭗ 111
Z 112
80 (initial mileage too high)
85 (wrecked after first test)
PERCENT CHANGE FROM BASE
TOTAL MILEAGE *10³
GROUP 3 HC

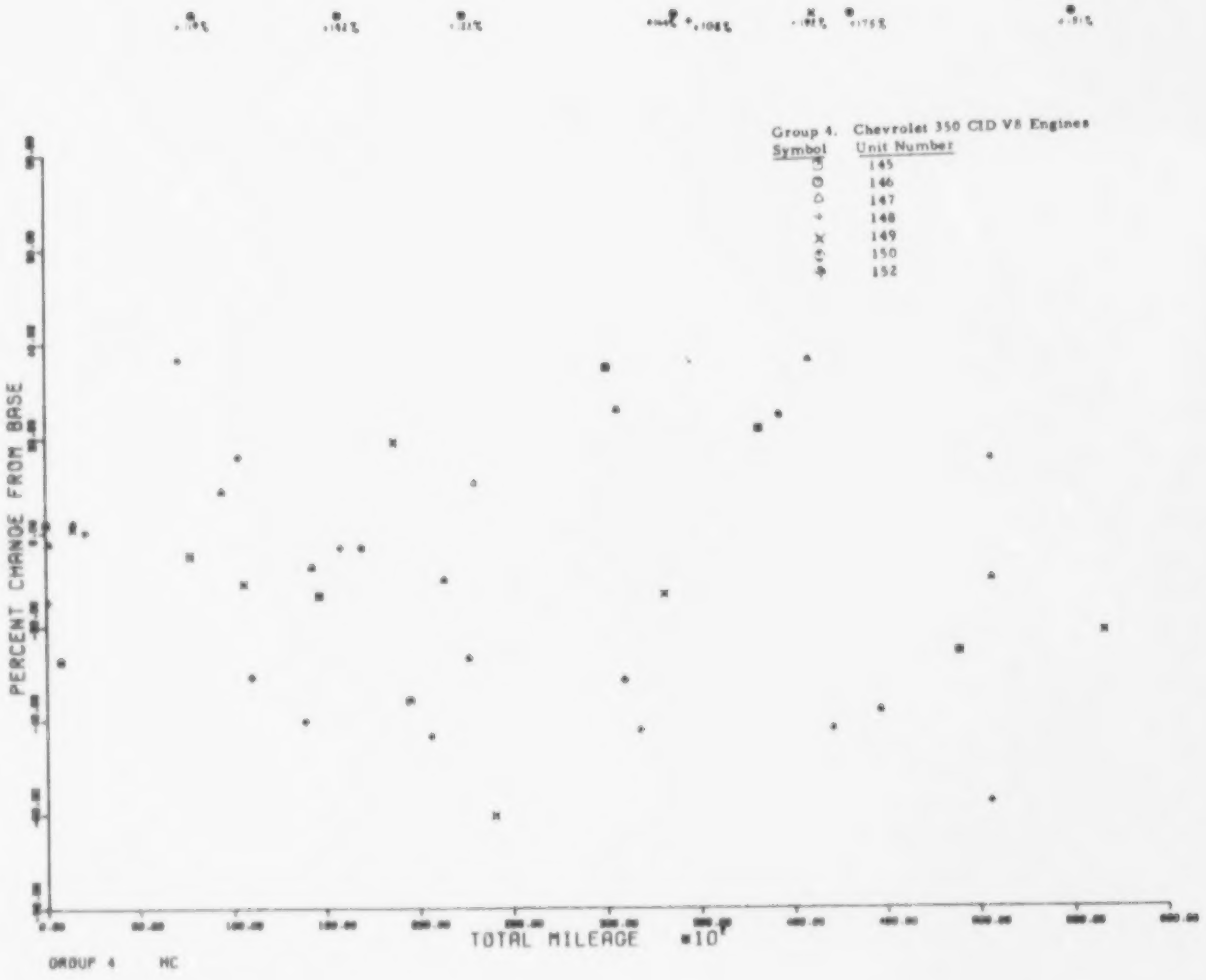


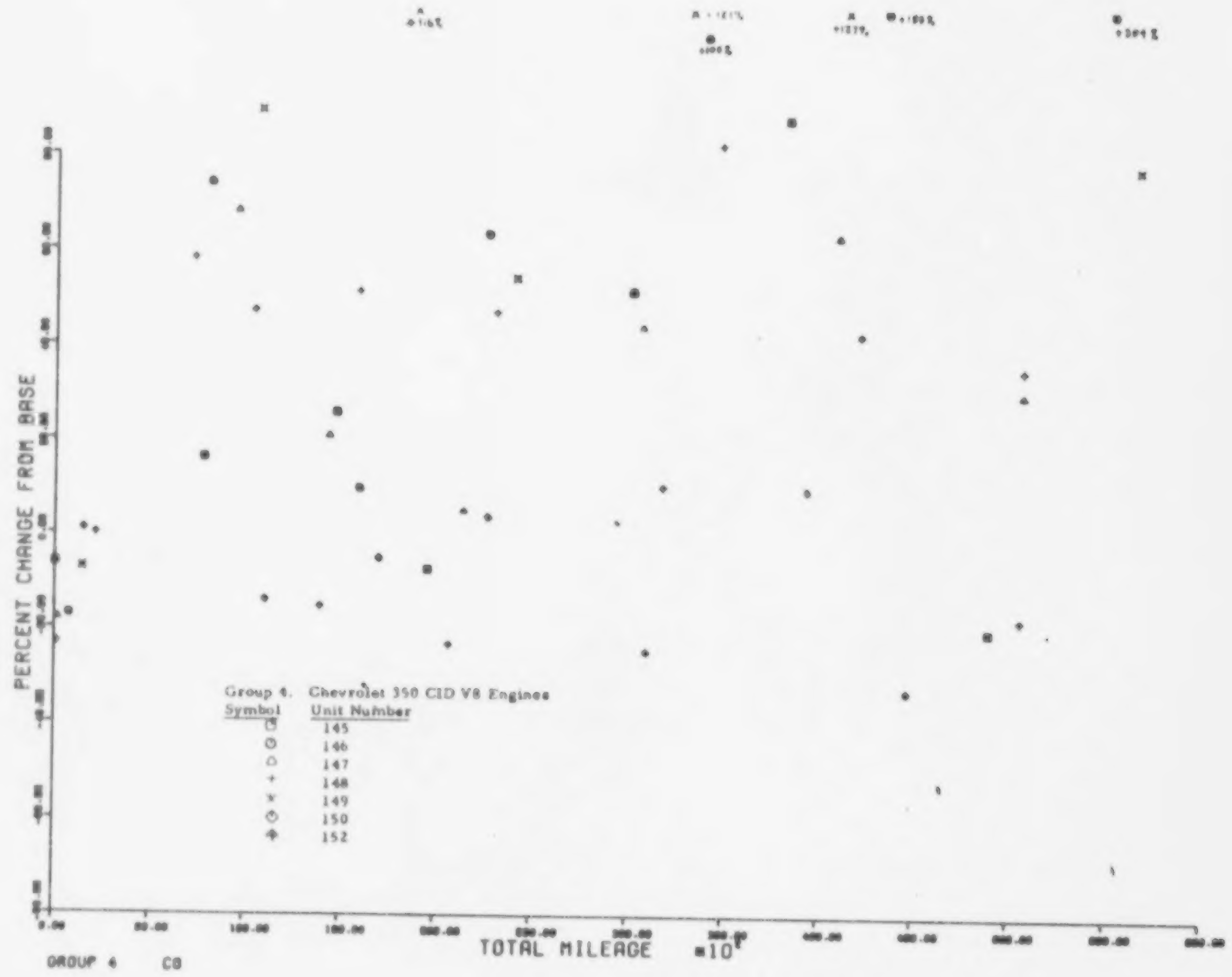
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10²
GROUP 3 CO
Group 3. Chevrolet 307 CID V8 Engine
Symbol Unit Number
⊡ 60
⊙ 61
△ 104
+ 107
× 108
◇ 109
✝ 110
⌘ 111
Z 112
60 (initial mileage too high)
85 (wrecked after first test)

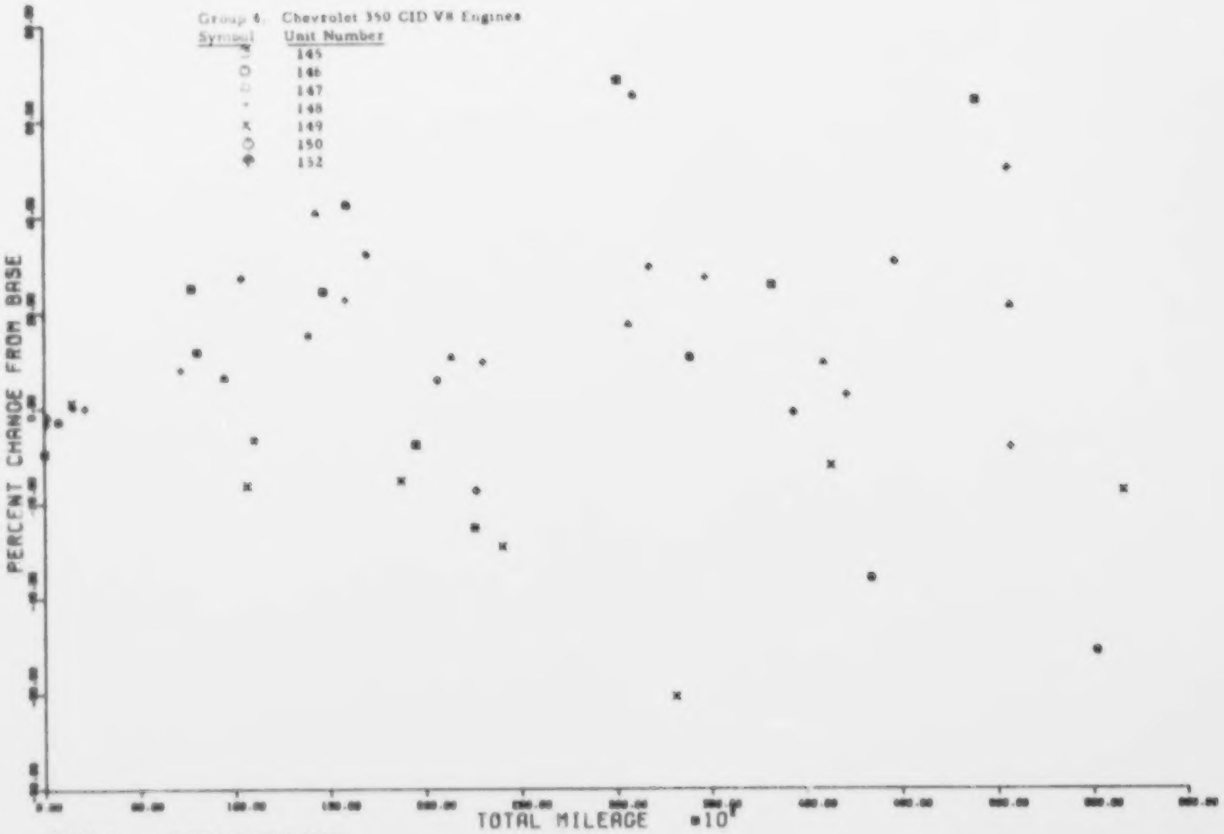

+162%, +130%
+119%
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE *10
GROUP 3 NO (NOT CORRECTED)
Group 3. Chevrolet 307 CID V8 Engine
Symbol Unit Number
□ 60
○ 61
△ 104
+ 107
× 108
○ 109
+ 110
x 111
Z 112
80 (initial mileage too high)
85 (wrecked after first test)



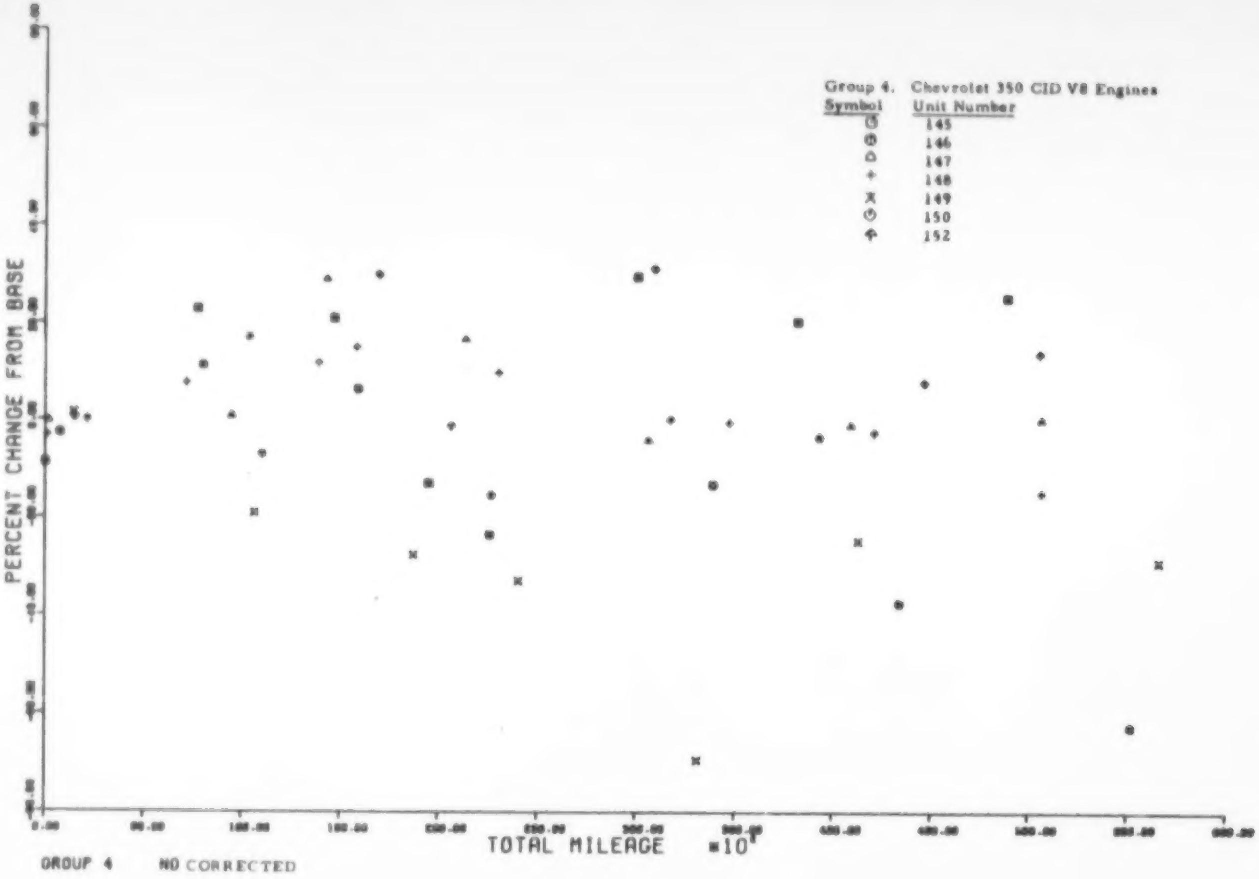
GROUP 3 NO CORRECTED

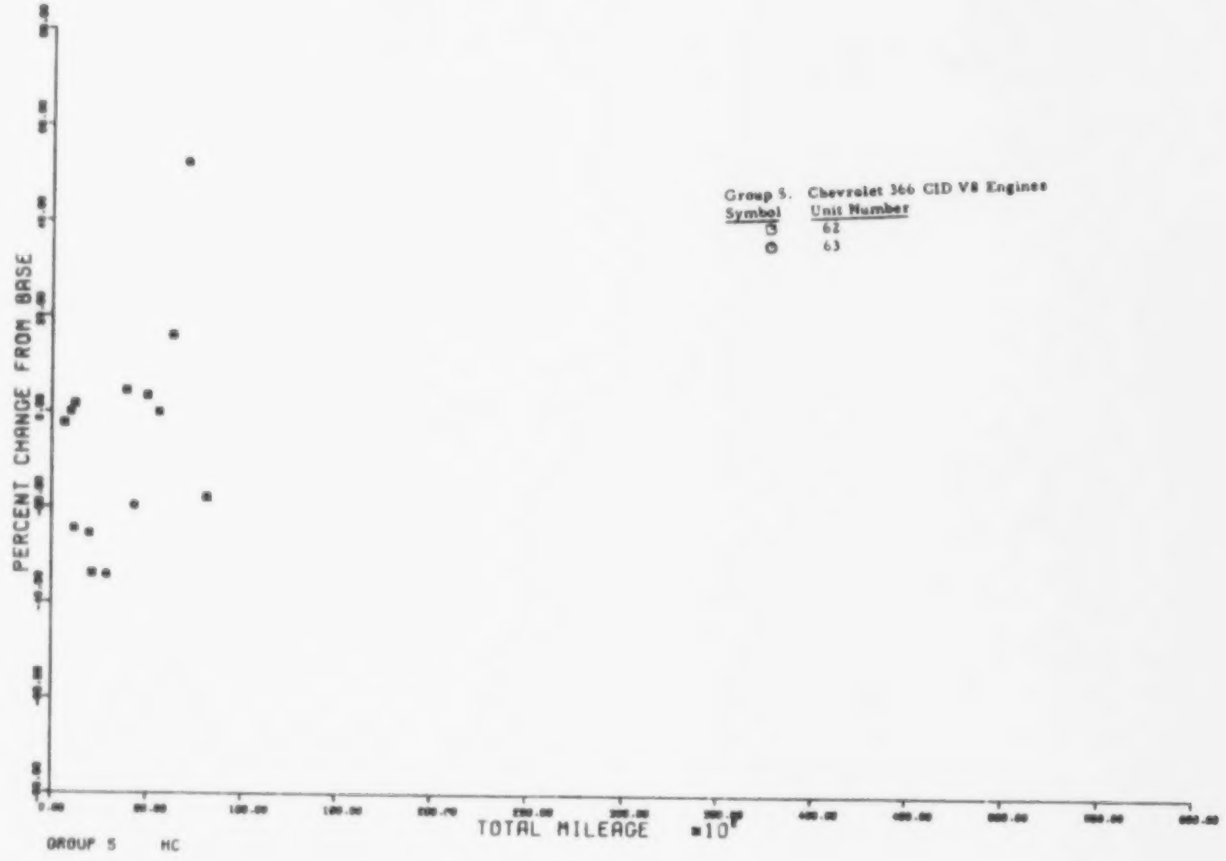

Group 4. Chevrolet 350 CID V8 Engines
Symbol
Unit Number
145
146
147
148
149
150
152
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE *10
GROUP 4 HC

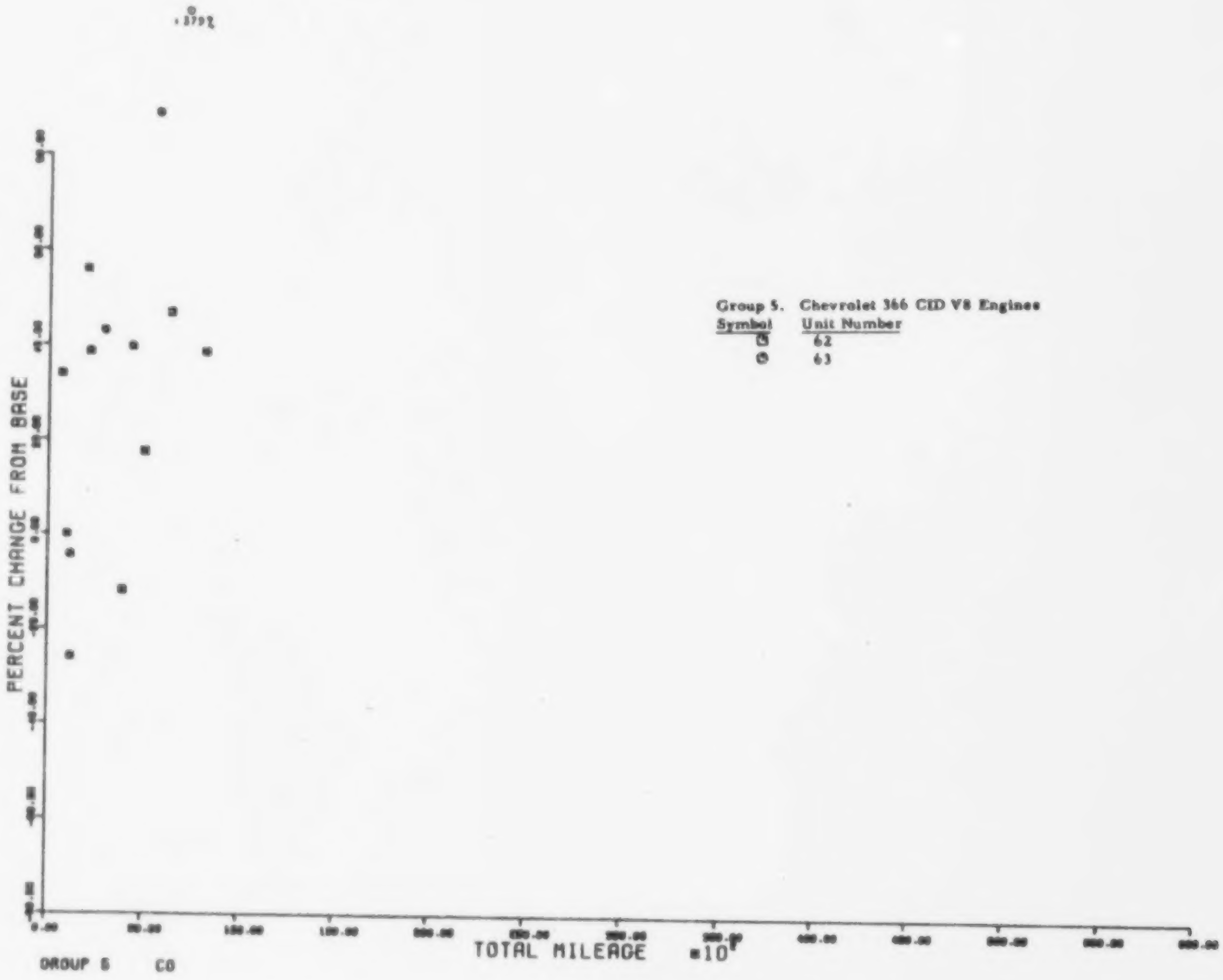

PERCENT CHANGE FROM BASE
TOTAL MILEAGE ×10
GROUP 4 CO
Group 4. Chevrolet 350 CID V8 Engines
Symbol Unit Number
□ 145
⊙ 146
△ 147
+ 148
× 149
◇ 150
✧ 152

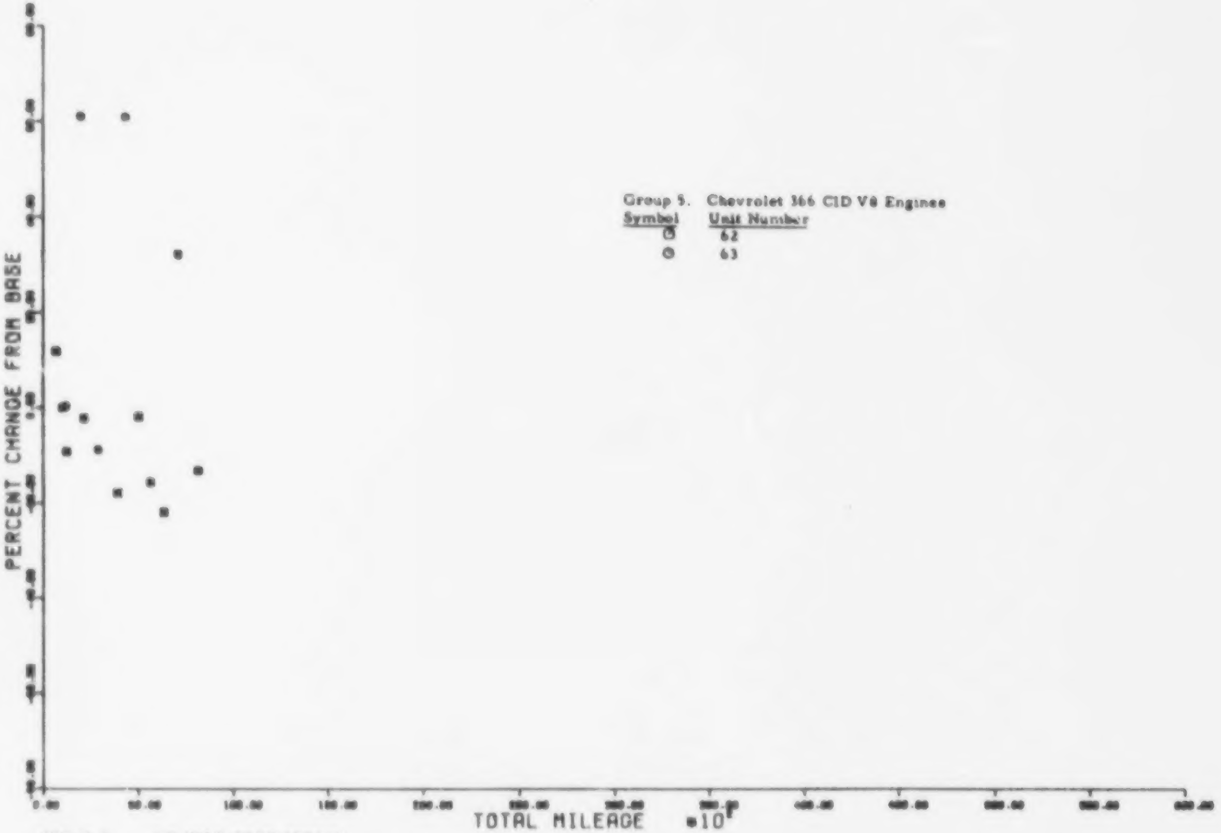


GROUP 4 NO (NOT CORRECTED)

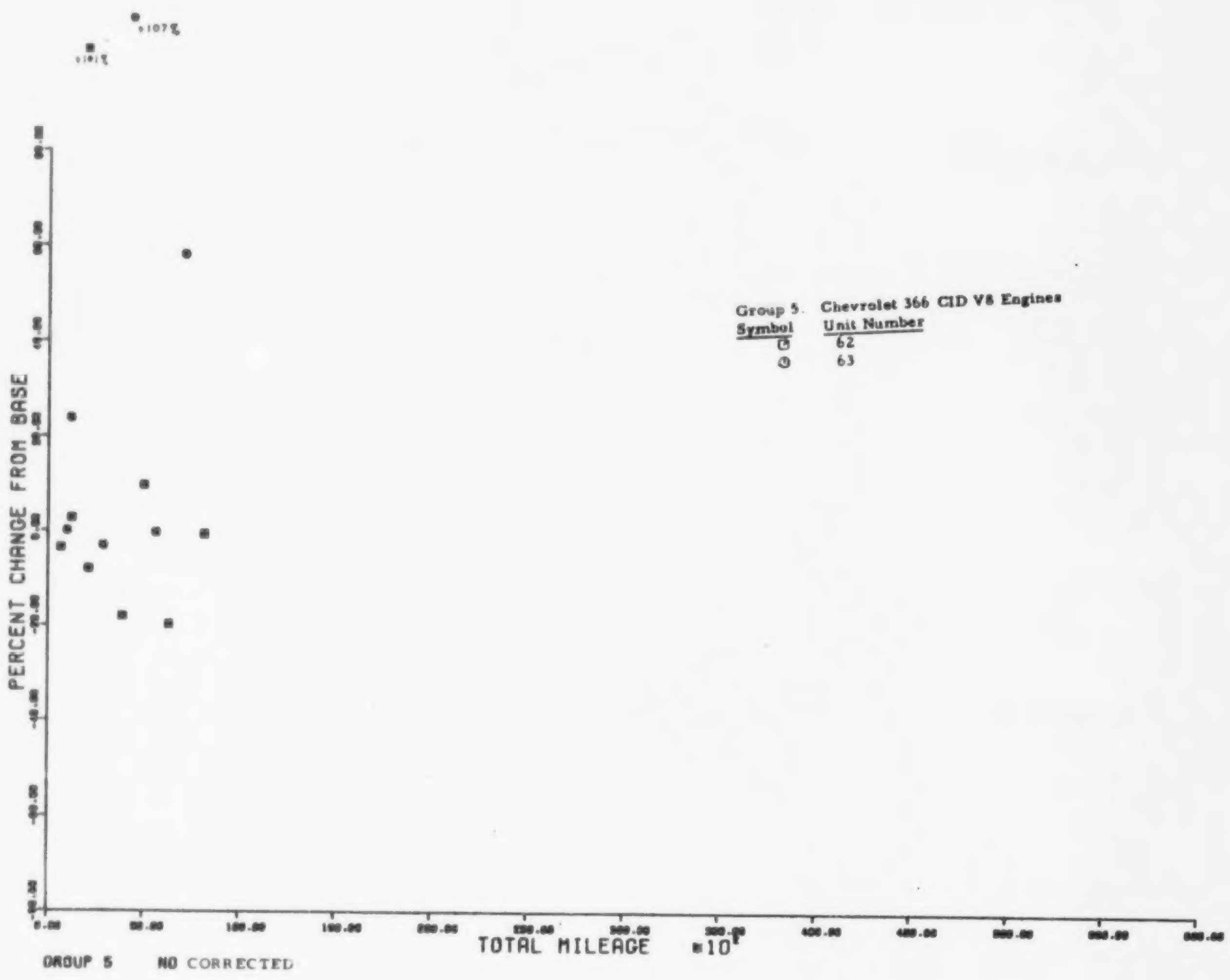
Group 4. Chevrolet 350 CID V8 Engines
Symbol Unit Number
145
146
147
+ 148
X 149
150
152
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10
GROUP 4 NO CORRECTED

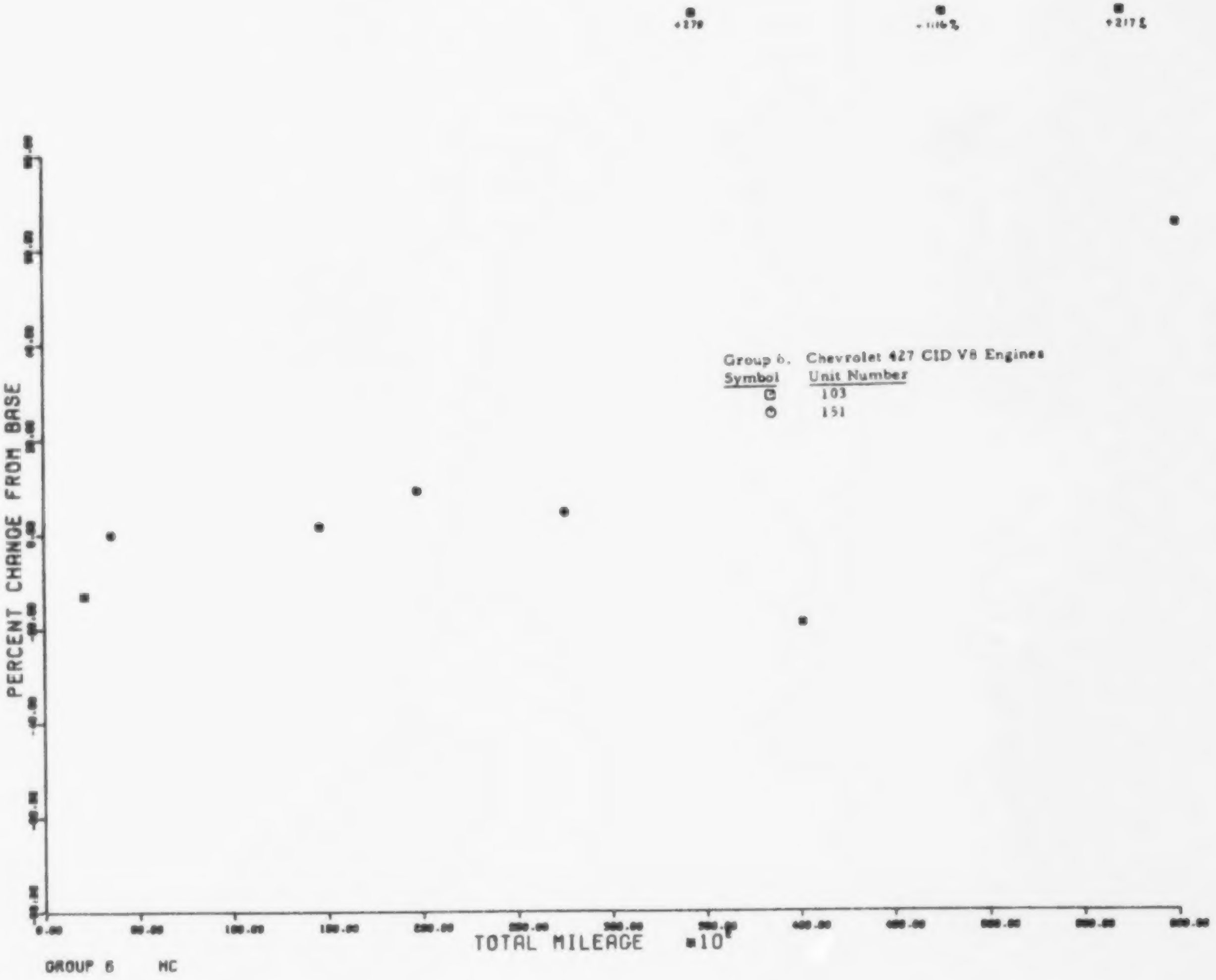

Group 5. Chevrolet 366 CID V8 Engines
Symbol Unit Number
62
63
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10
GROUP 5 HC


+379%
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10
GROUP 5 CO
Group 5. Chevrolet 366 CID V8 Engines
Symbol Unit Number
62
63



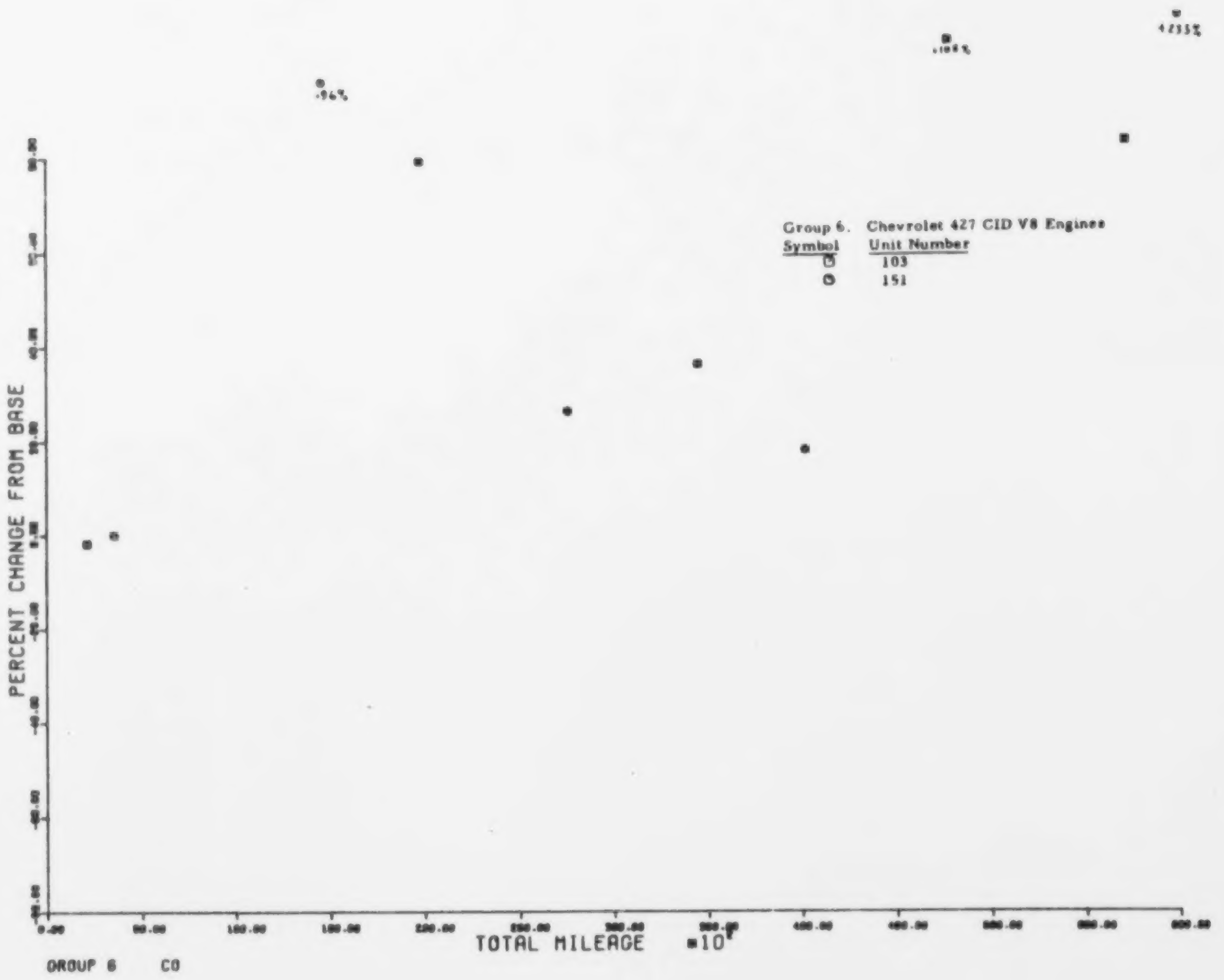
GROUP 5 NO (NOT CORRECTED)

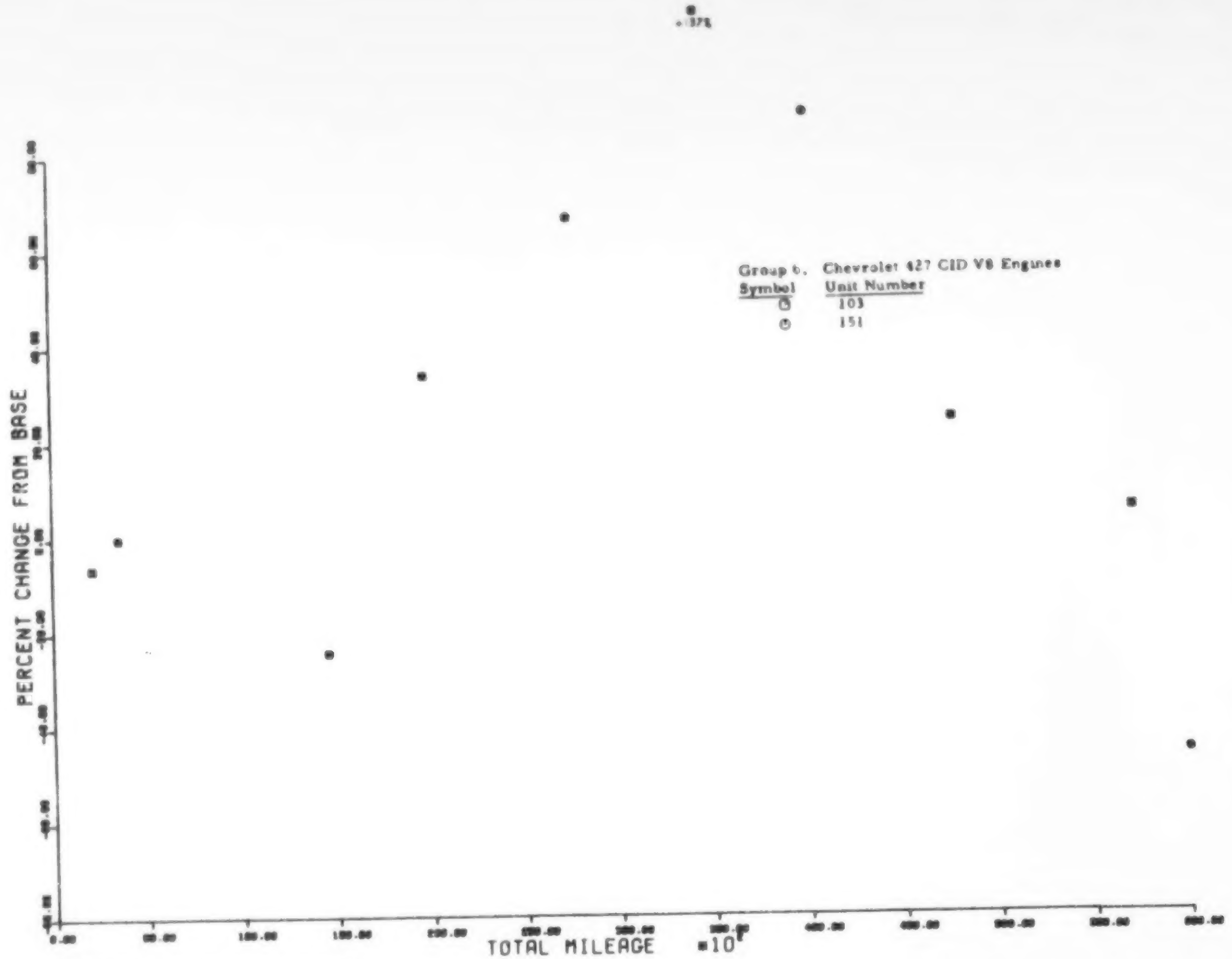
+101%
+107%
Group 5 Chevrolet 366 CID V8 Engines
Symbol Unit Number
□ 62
○ 63
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10
GROUP 5 NO CORRECTED



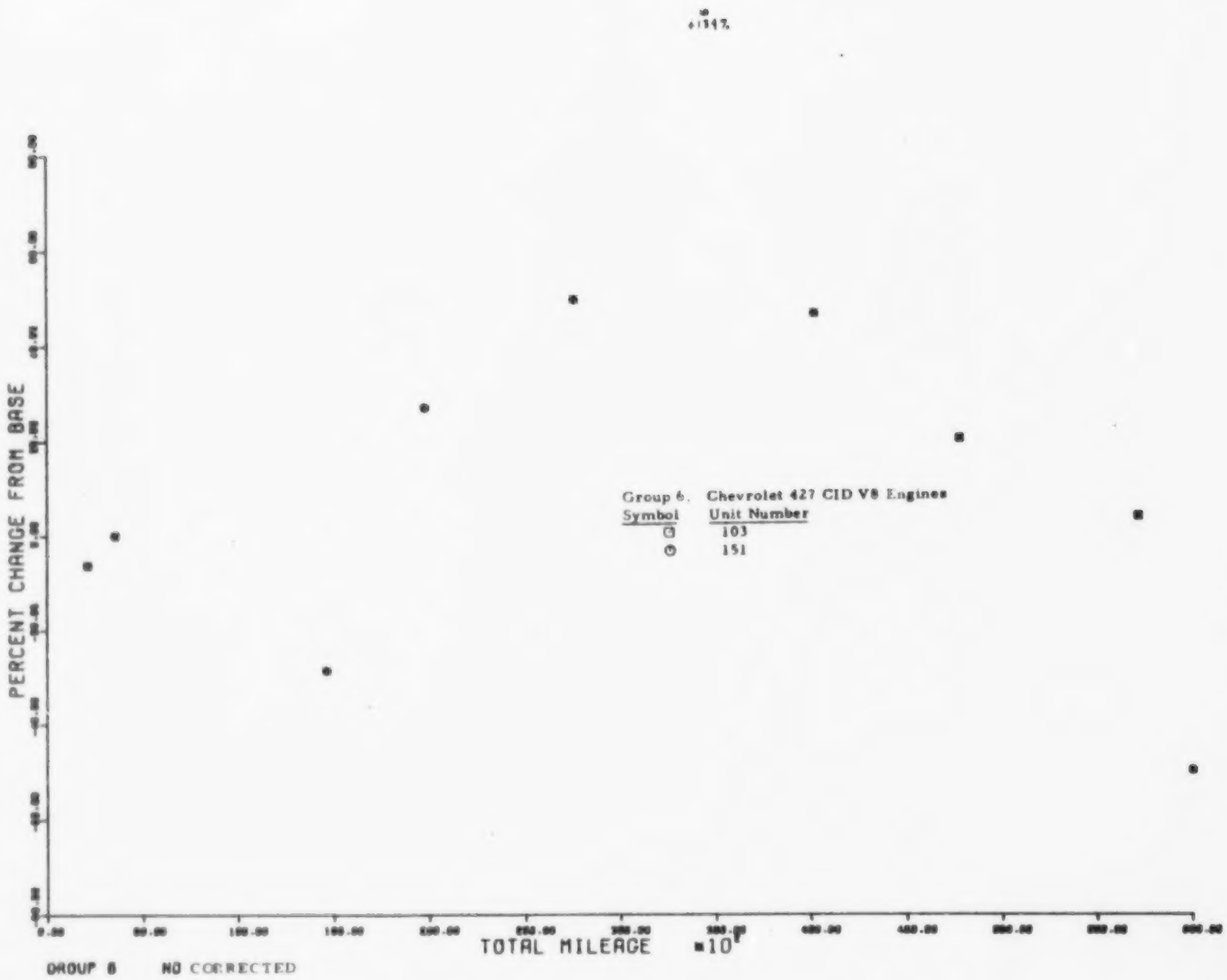
Group 6. Chevrolet 427 CID V8 Engines

Symbol	Unit Number
⊡	103
○	151


+96%
+108%
+235%
Group 6. Chevrolet 427 CID V8 Engines
Symbol
Unit Number
▢ 103
○ 151
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10²
GROUP 6 CO

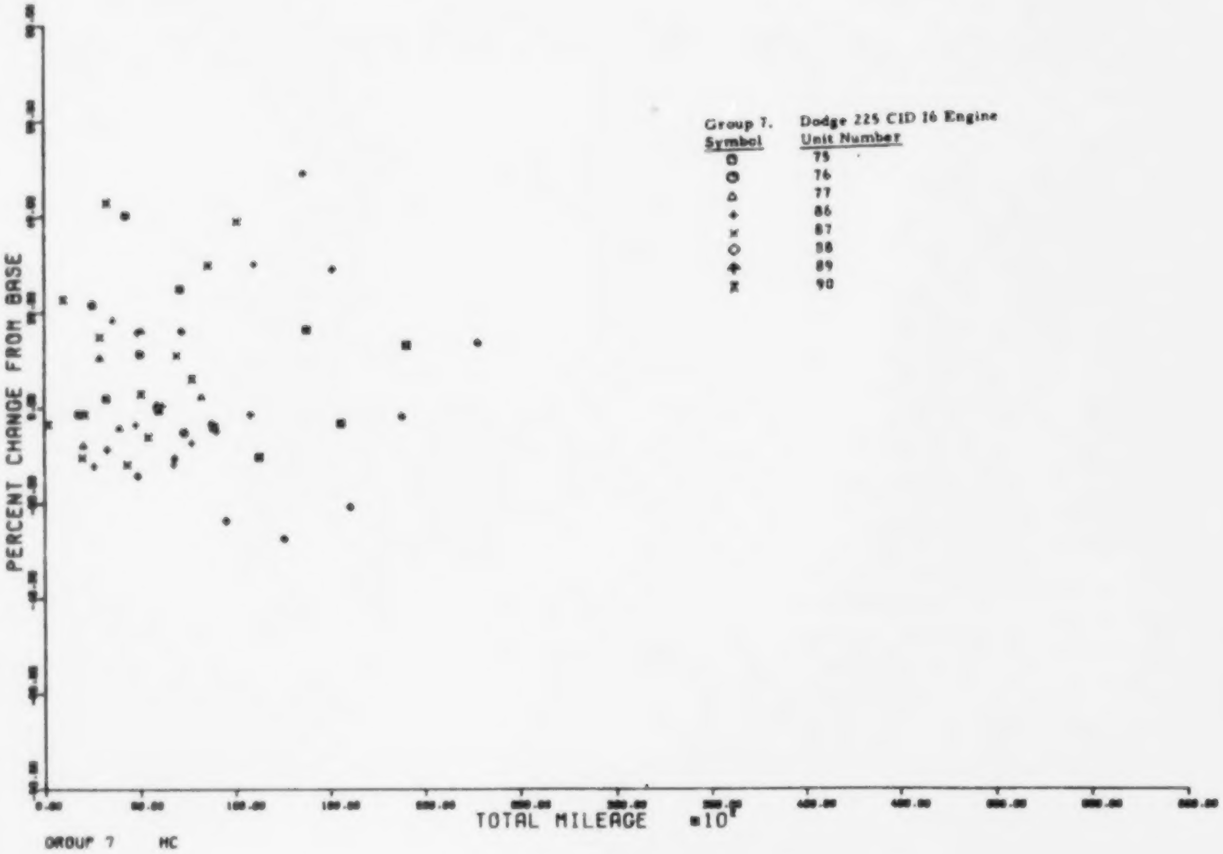


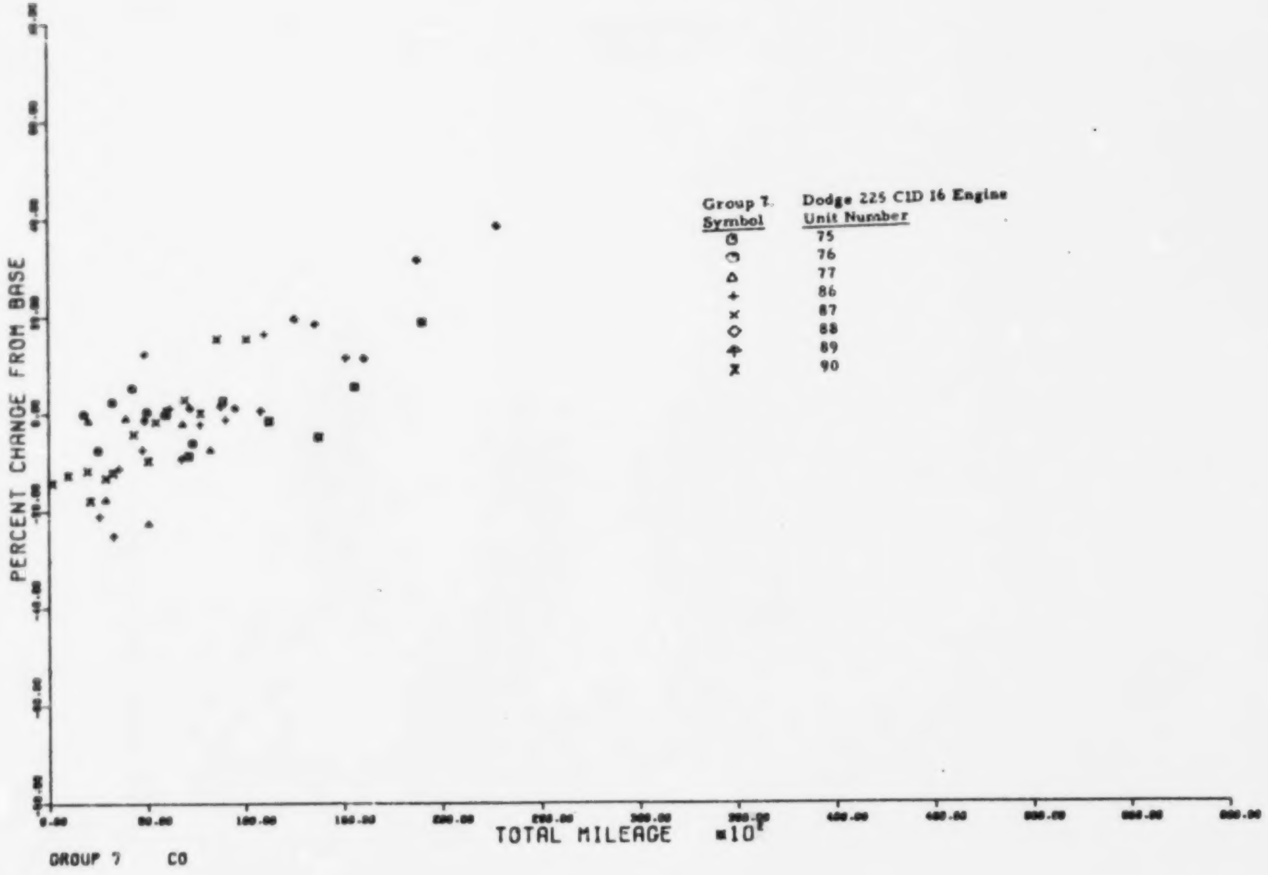
GROUP 6 NO (NOT CORRECTED)

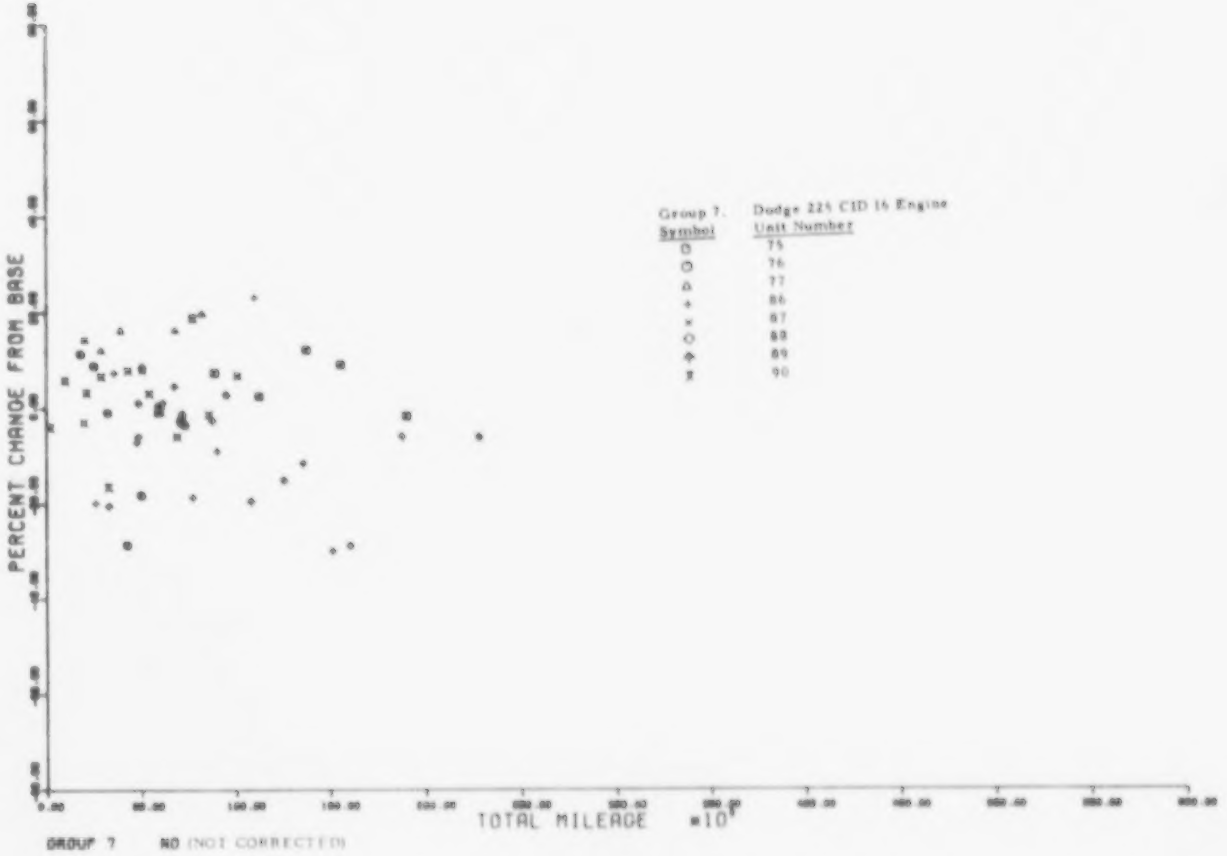


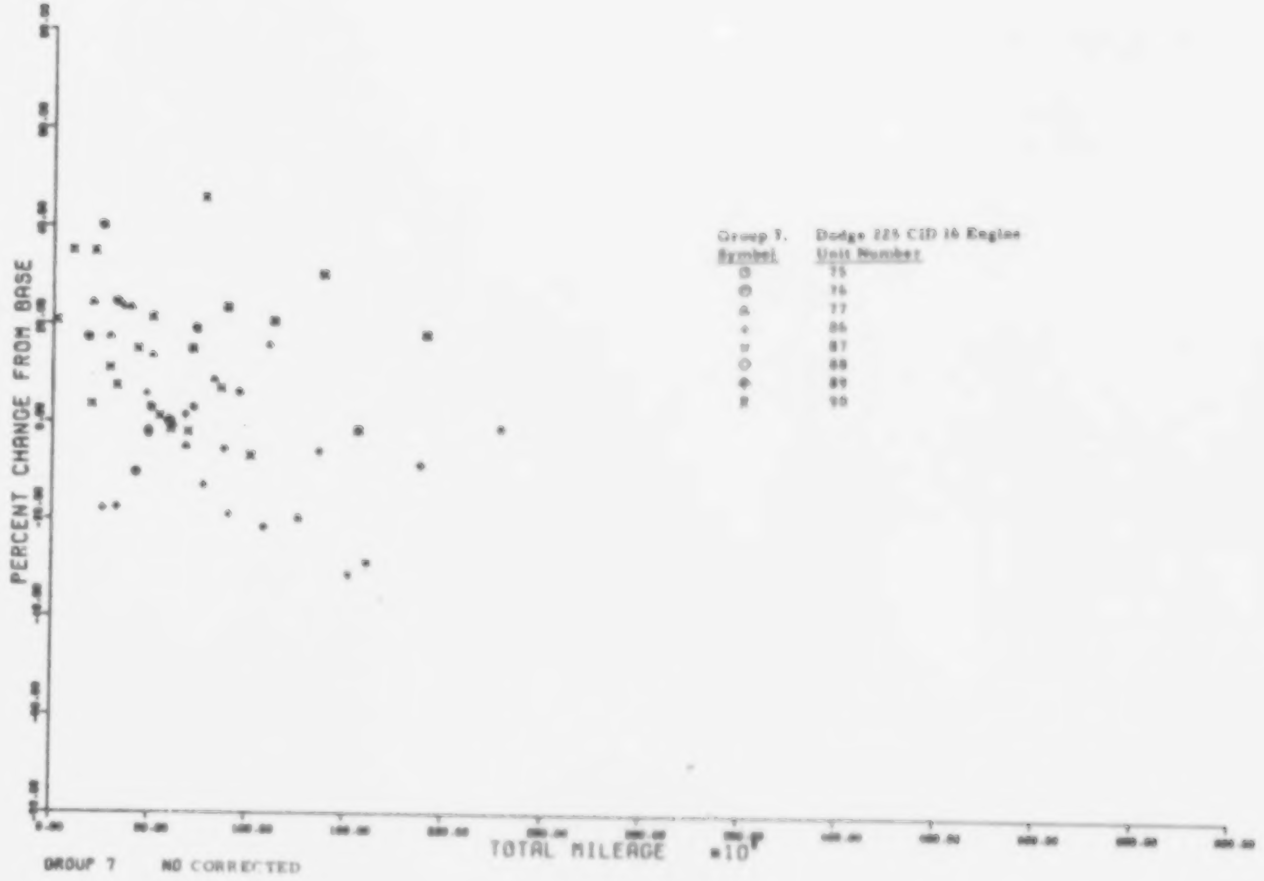
Group 6. Chevrolet 427 CID V8 Engines

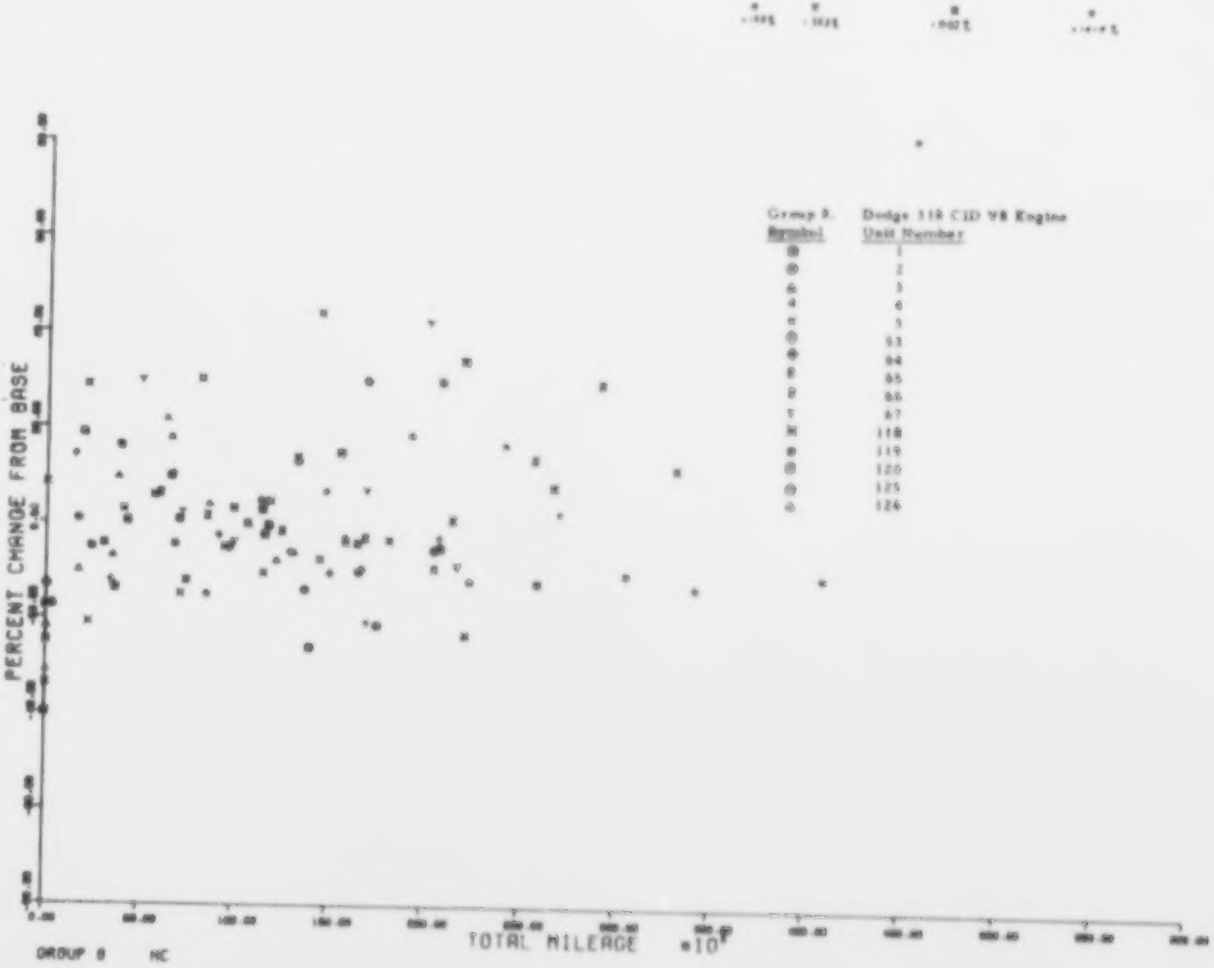
Symbol	Unit Number
▢	103
⊙	151

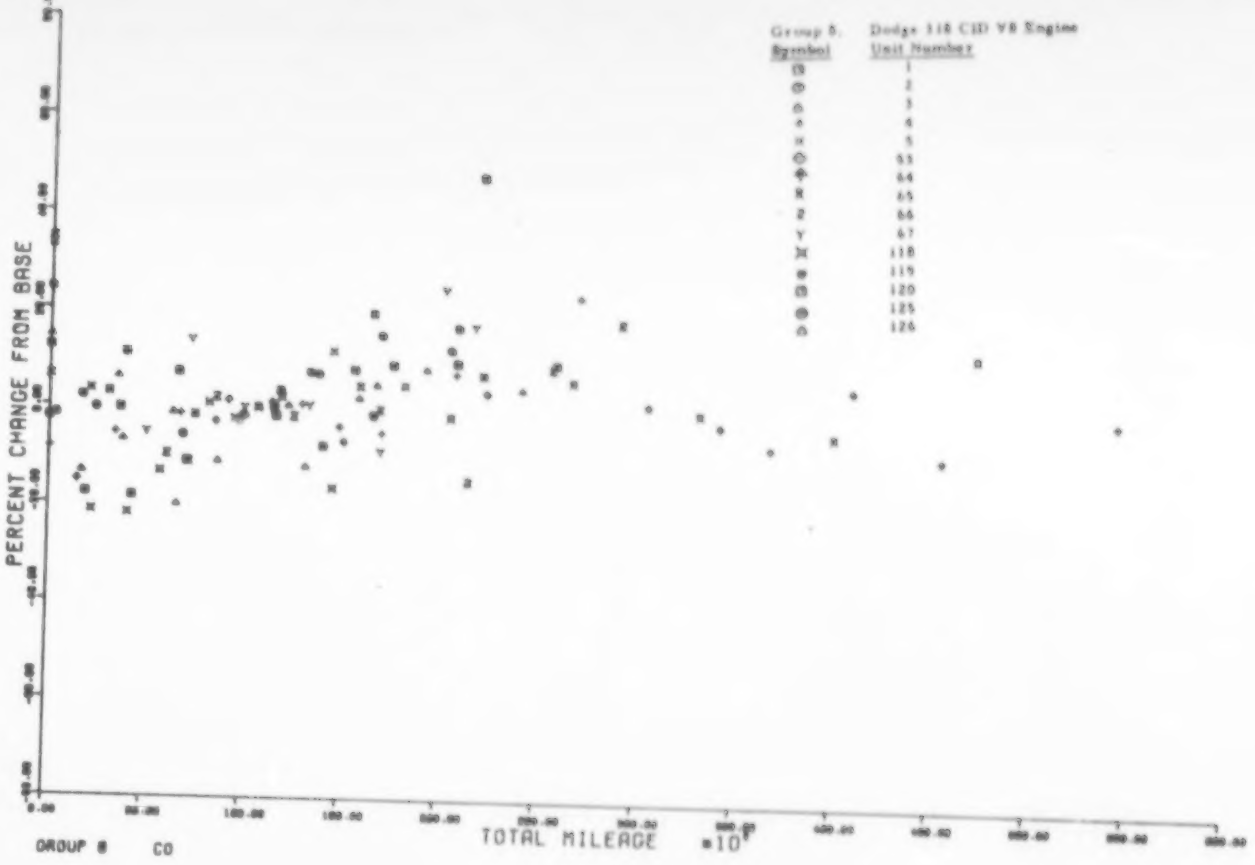

Group 7. Symbol
Dodge 225 CID I6 Engine Unit Number
□ 75
○ 76
△ 77
+ 86
× 87
◇ 88
✦ 89
ж 90
PERCENT CHANGE FROM BASE
TOTAL MILEAGE *10
GROUP 7 HC

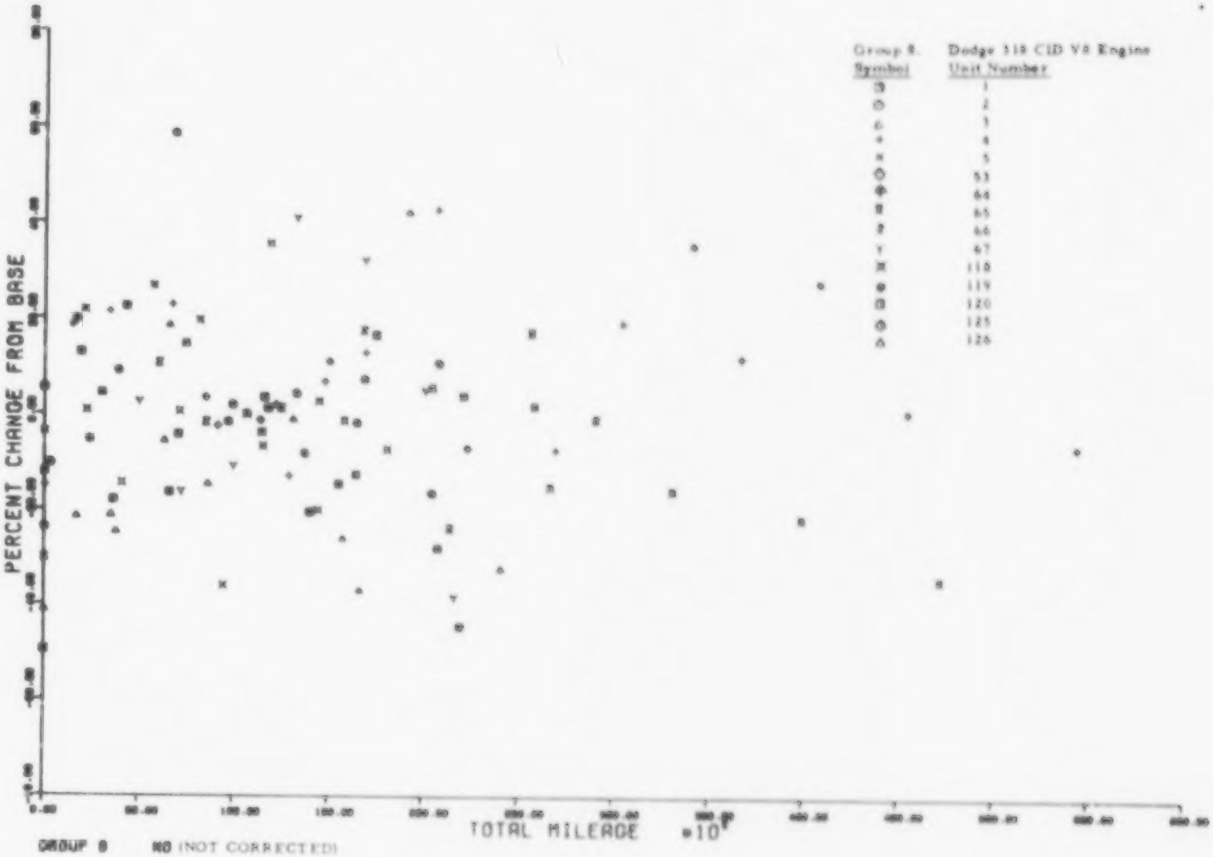
PERCENT CHANGE FROM BASE
0.00
-10.00
TOTAL MILEAGE ×10
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
GROUP 7 CO
Group 7 Symbol
Dodge 225 CID I6 Engine Unit Number
75
76
77
86
87
88
89
90


PERCENT CHANGE FROM BASE
TOTAL MILEAGE ×10
0.00
Group 7. Dodge 225 CID I6 Engine
Symbol
Unit Number
75
76
77
86
87
88
89
90
GROUP 7 NO (NOT CORRECTED)

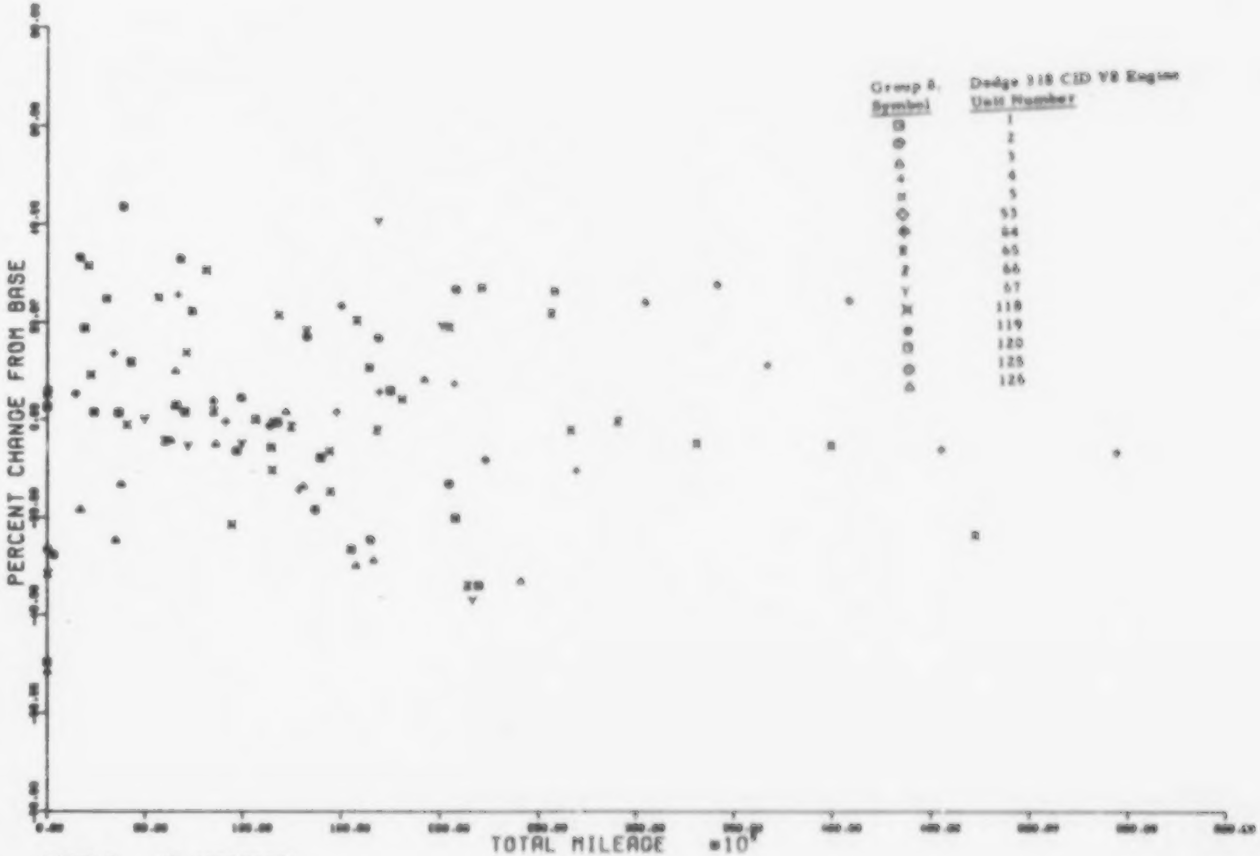

PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE *10
GROUP 7
NO CORRECTED
Group 7. Dodge 225 CID I6 Engine
Symbol Unit Number
⊙ 75
⊙ 76
△ 77
+ 86
▽ 87
◇ 88
◆ 89
⊠ 90


PERCENT CHANGE FROM BASE
TOTAL MILEAGE *10
GROUP 8 HC
Group 8. Symbol
Dodge 318 CID V8 Engine Unit Number
1
2
3
4
5
63
64
65
66
67
118
119
120
125
126

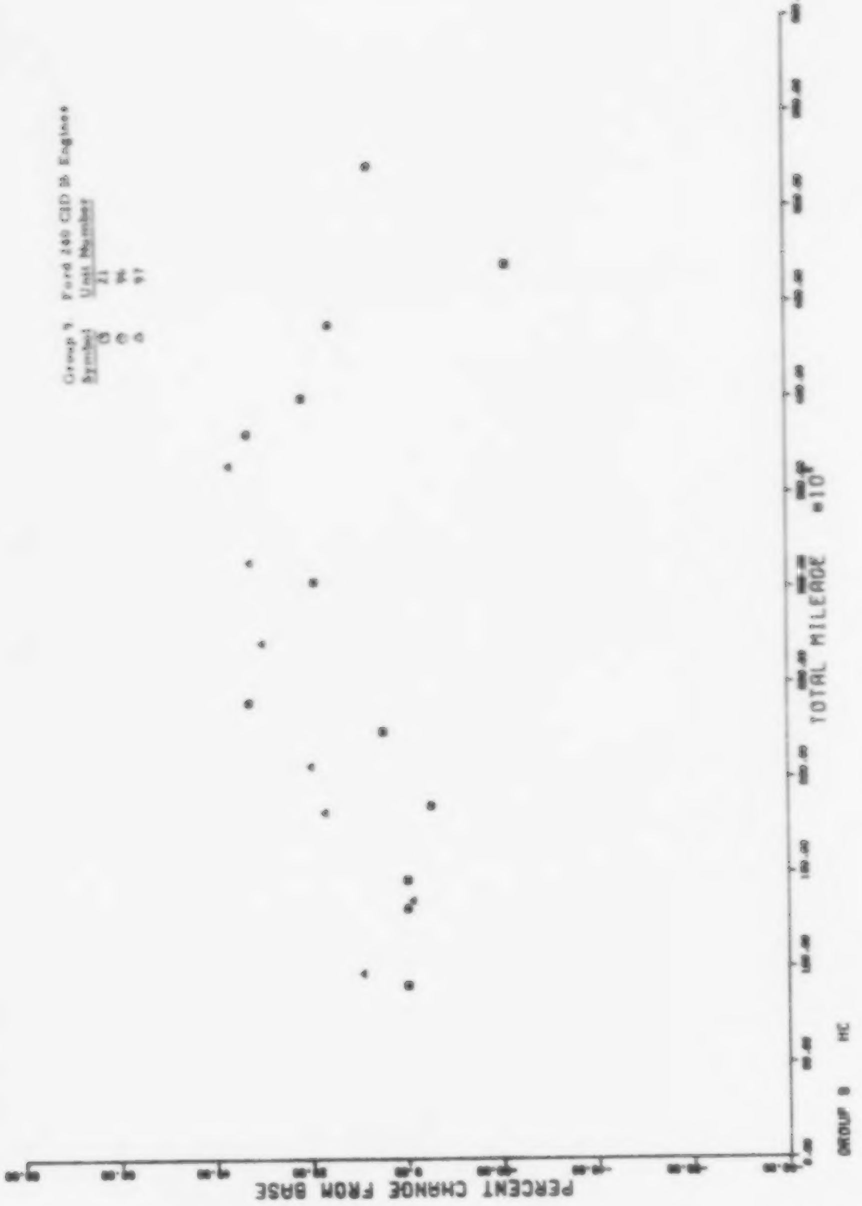

Group 5. Dodge 318 CID V8 Engine
Symbol
Unit Number
1
2
3
4
5
63
64
65
66
67
118
119
120
125
126
PERCENT CHANGE FROM BASE
0.00
-10.00
0.00
100.00
TOTAL MILEAGE *10
GROUP 5 CO



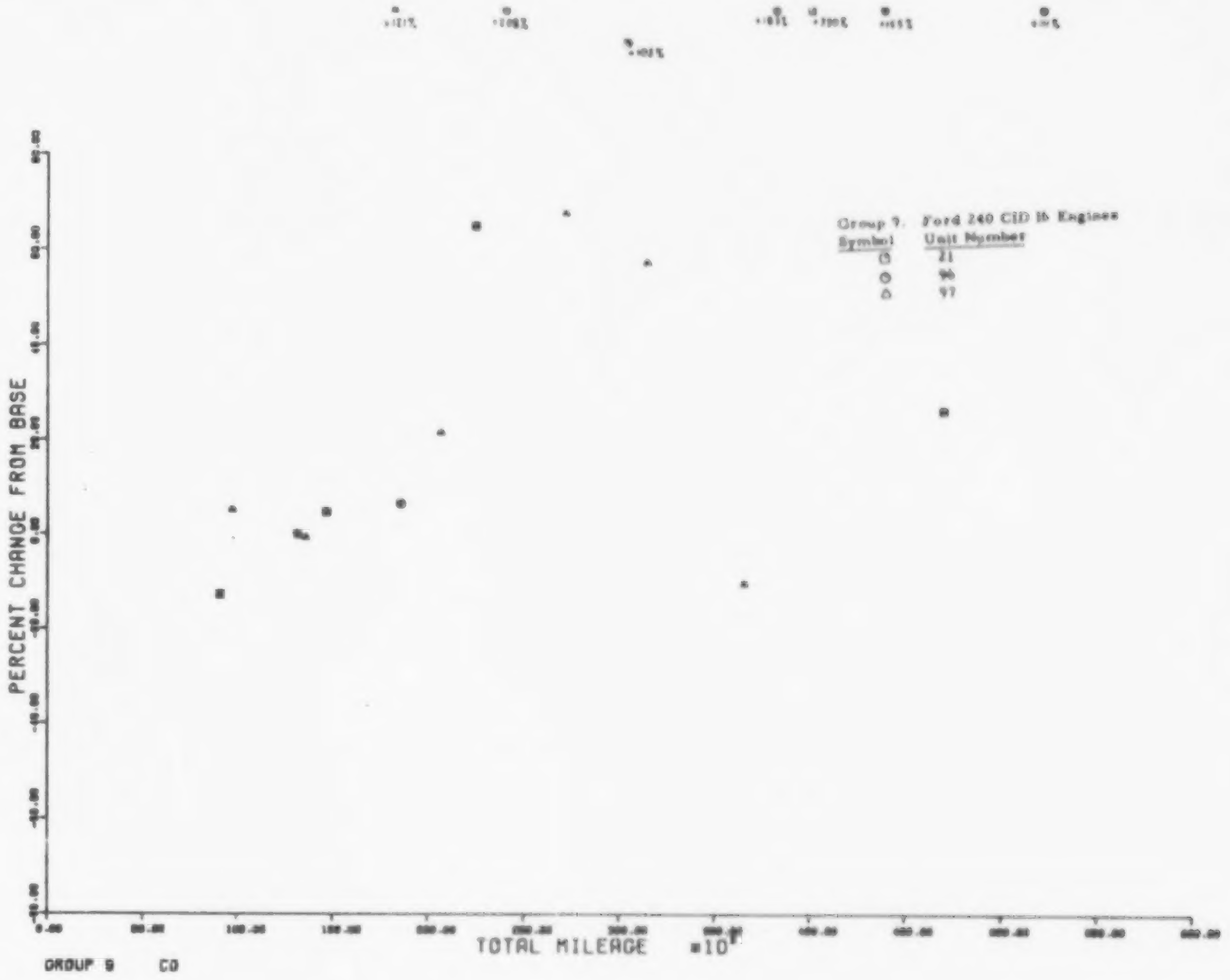
GROUP 8 NO (NOT CORRECTED)

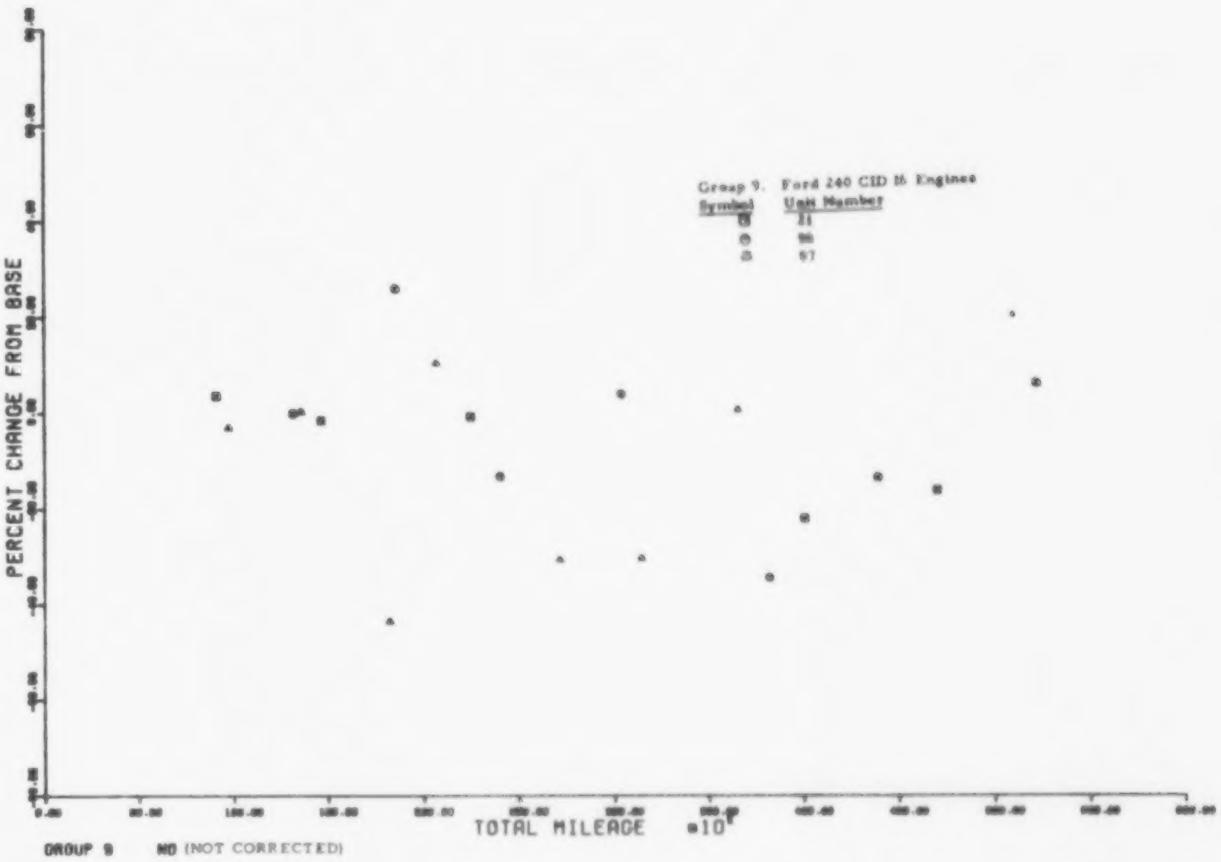


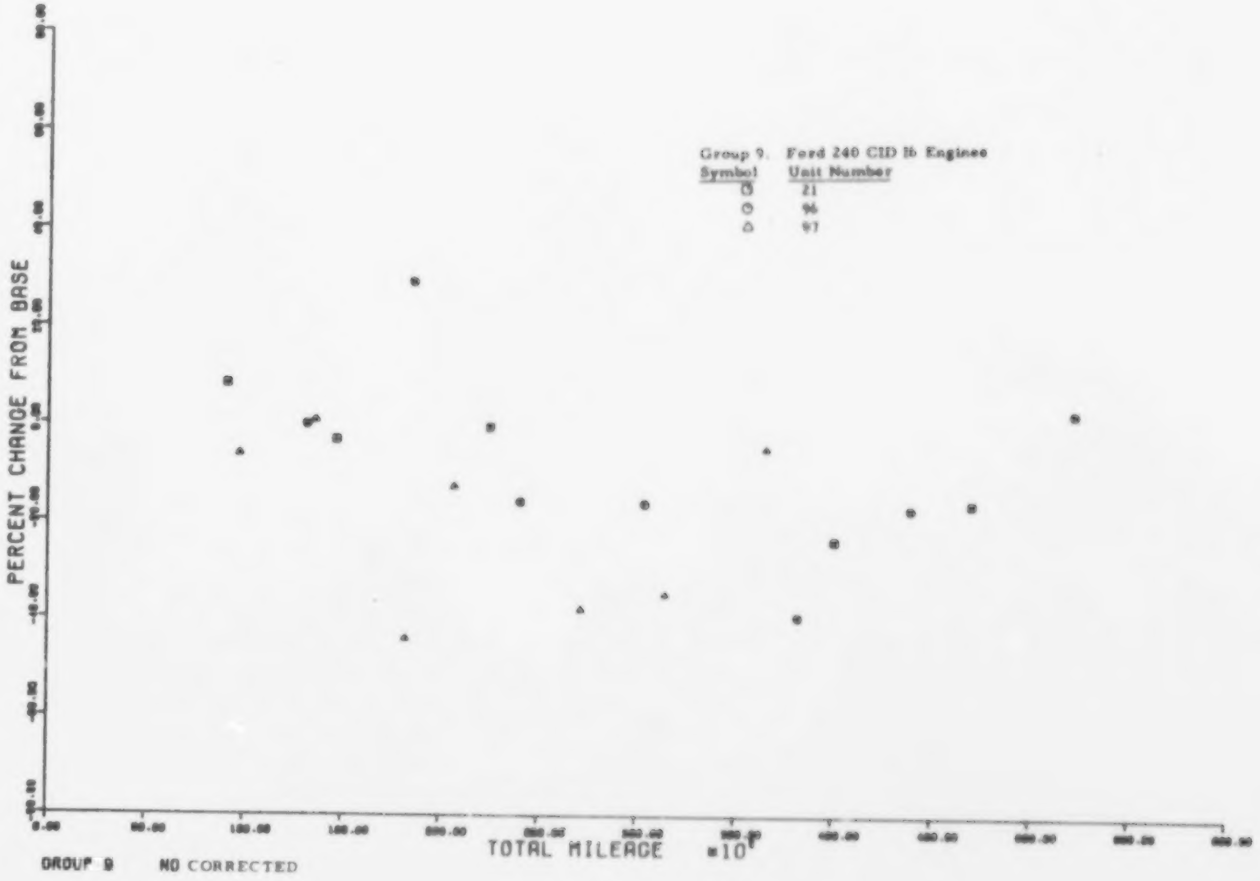
GROUP 8 NO CORRECTED

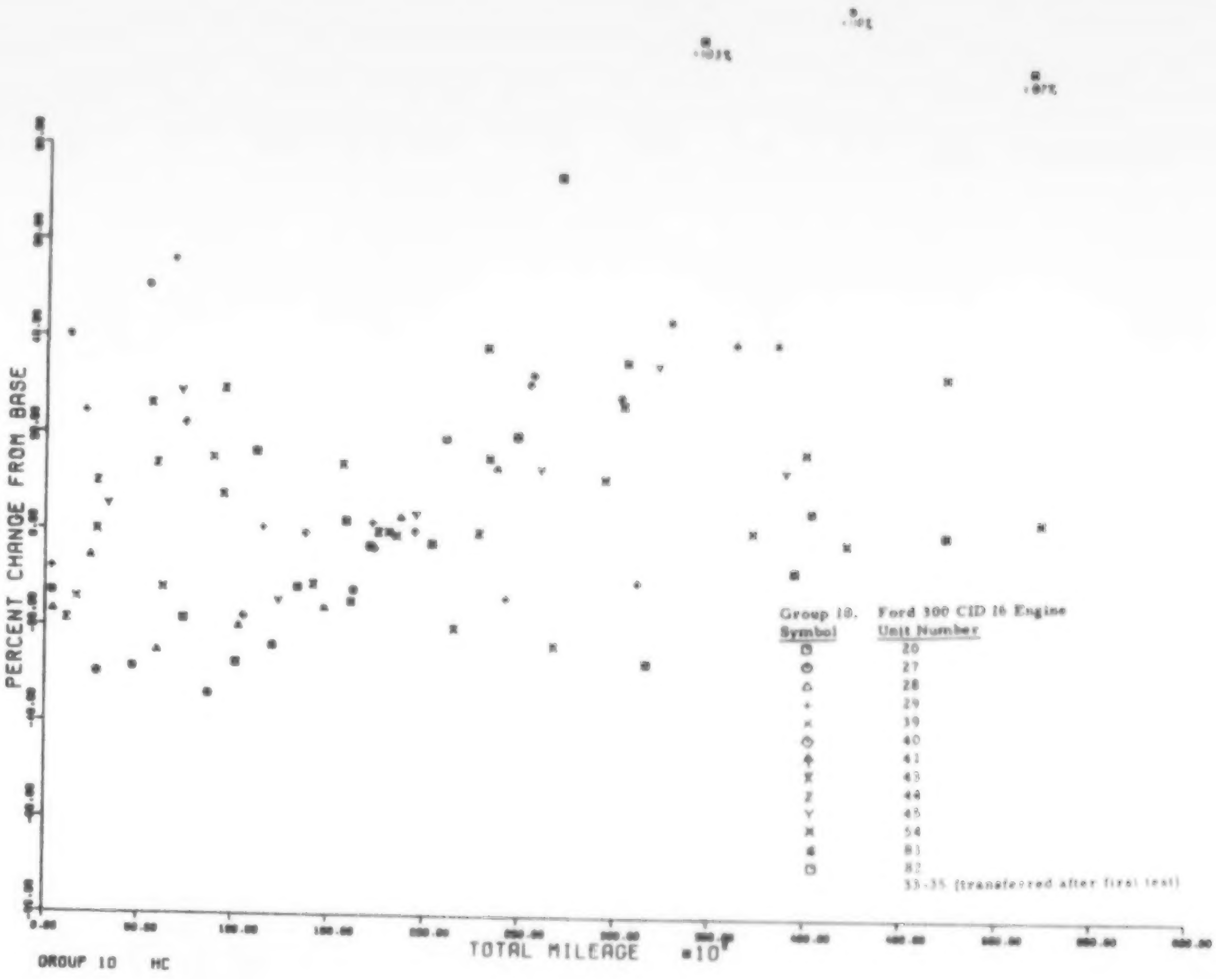


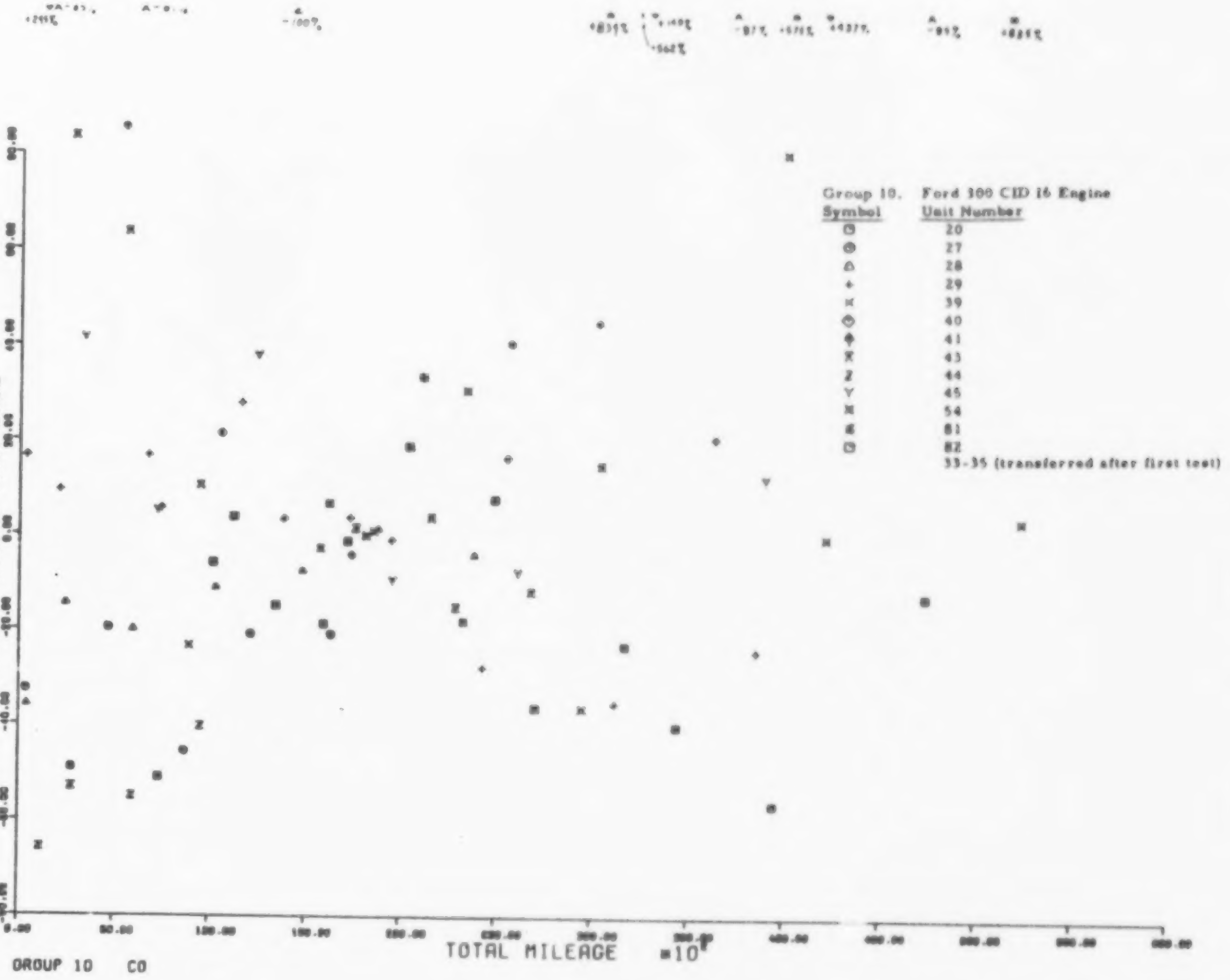
Group 9 Ford 240 CID 16 Engines
Symbol
Unit Number
21
96
97
PERCENT CHANGE FROM BASE
TOTAL MILEAGE
*10³
GROUP 9 HC

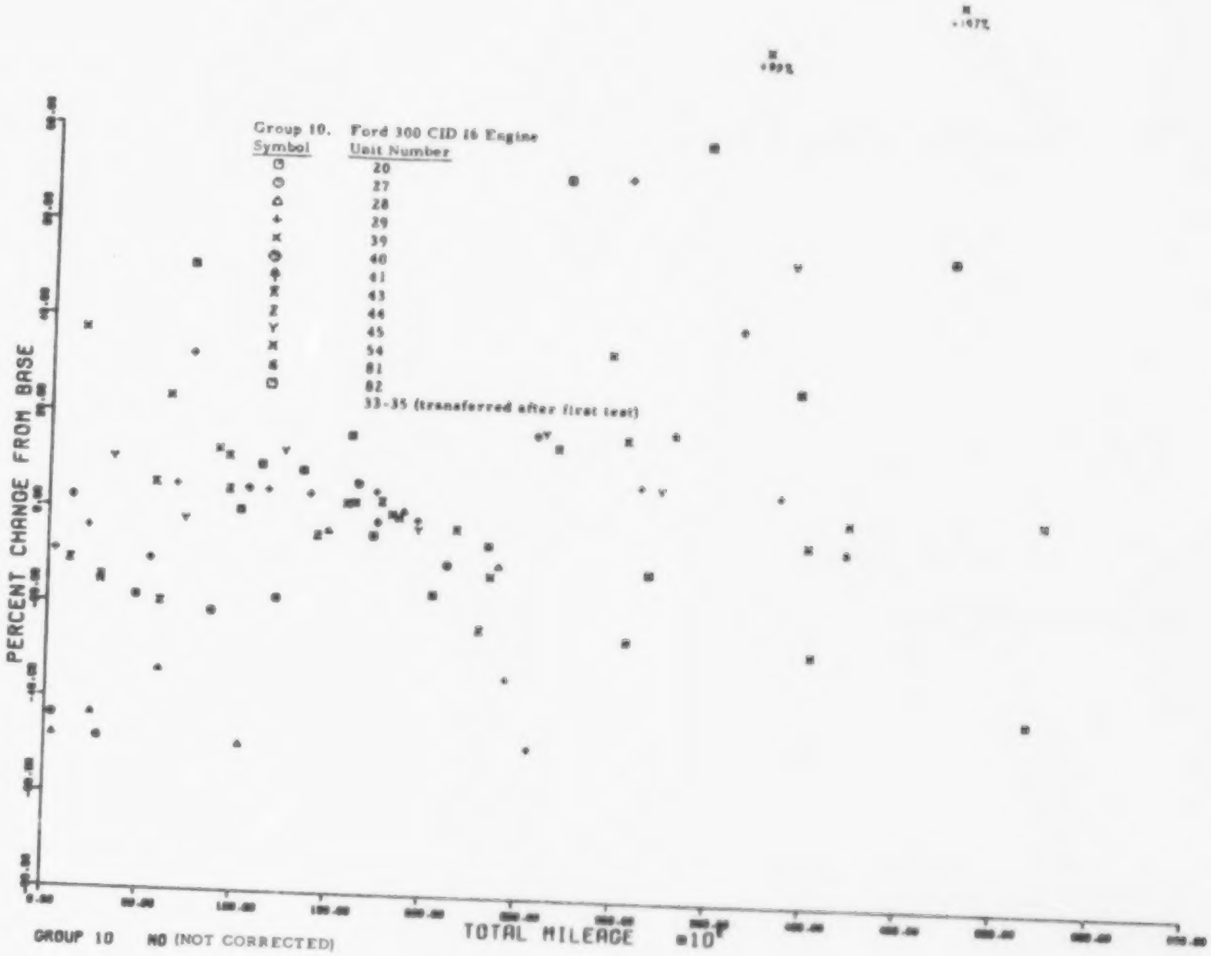

Group 9. Ford 240 CID I6 Engines
Symbol
Unit Number
⊡ 21
⊙ 96
△ 97
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
TOTAL MILEAGE *10
GROUP 9 CO

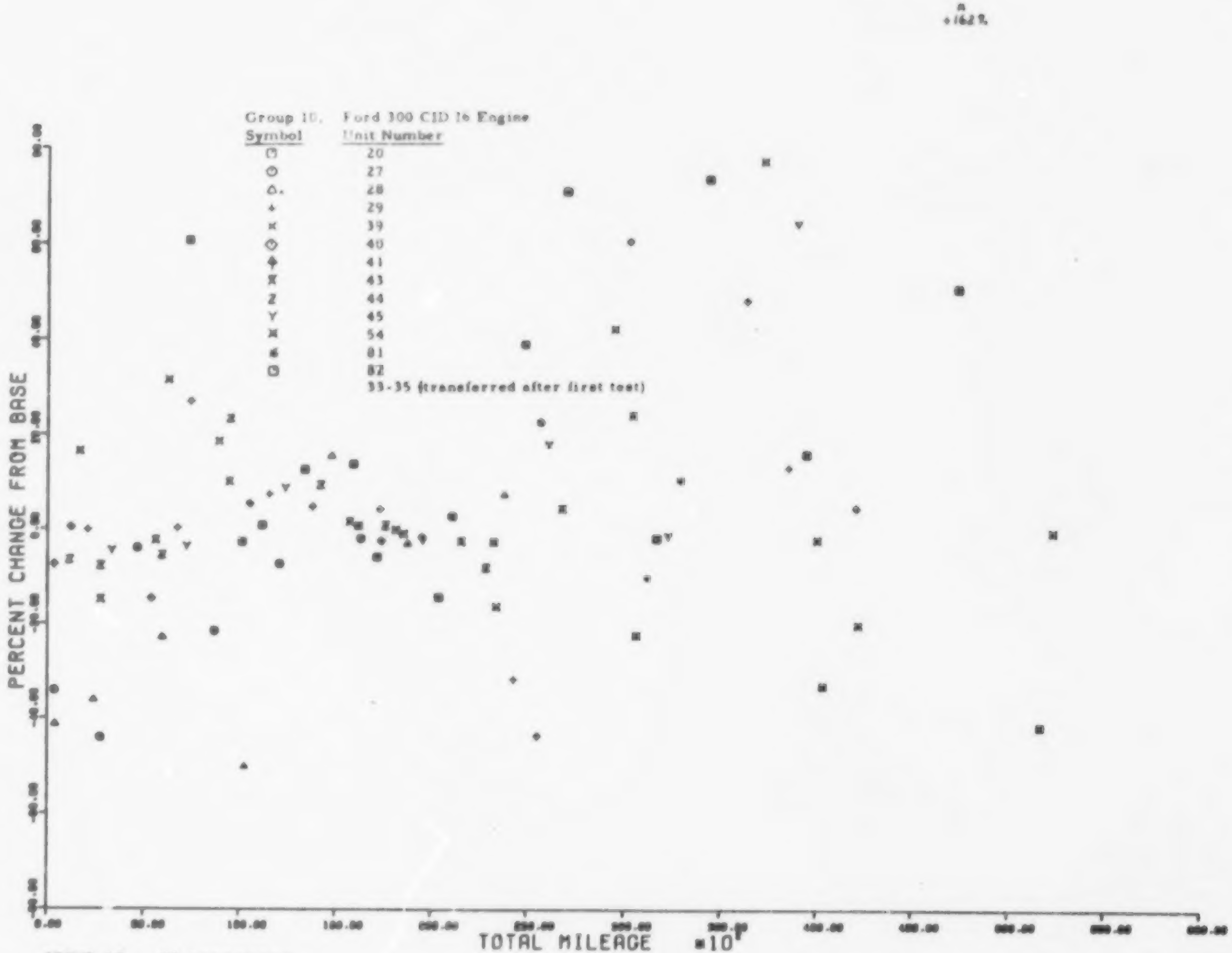

Group 9. Ford 240 CID I6 Engines
Symbol Unit Number
▣ 11
⊙ 96
△ 97
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE *10
GROUP 9 NO (NOT CORRECTED)


Group 9. Ford 240 CID Ib Engines
Symbol Unit Number
▢ 21
○ 96
△ 97
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10
GROUP 9 NO CORRECTED

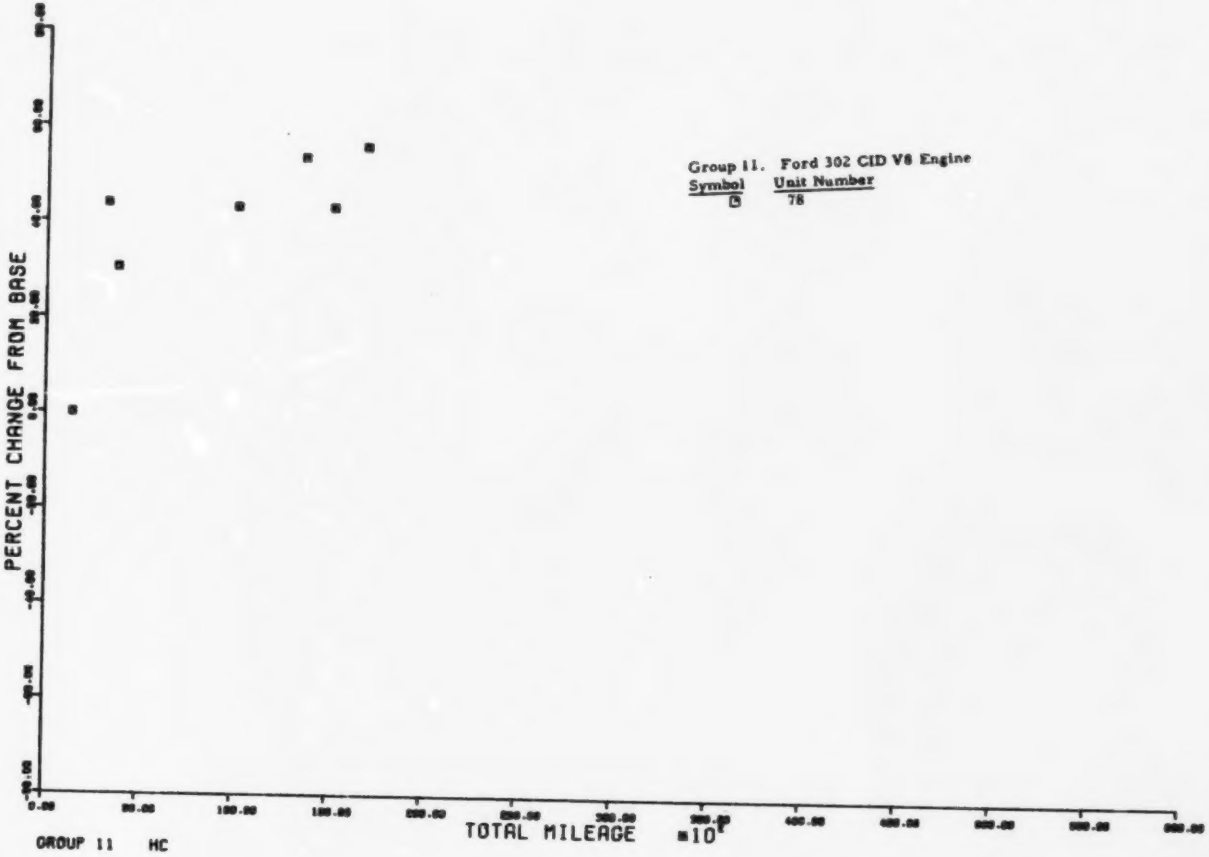

PERCENT CHANGE FROM BASE
TOTAL MILEAGE *10
GROUP 10 HC
0.00
50.00
100.00
40.00
0.00
-10.00
+103%
+10%
+97%
Group 10. Ford 300 CID I6 Engine
Symbol Unit Number
20
27
28
29
39
40
41
43
44
45
54
81
82
33-35 (transferred after first test)


-100%
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10³
GROUP 10 CO
Group 10. Ford 300 CID I6 Engine
Symbol
Unit Number
20
27
28
29
39
40
41
43
44
45
54
81
82
33-35 (transferred after first test)


Group 10. Ford 300 CID I6 Engine
Symbol
Unit Number
20
27
△ 28
+ 29
× 39
40
41
X 43
Z 44
Y 45
54
81
82
33-35 (transferred after first test)
+99%
+197%
PERCENT CHANGE FROM BASE
0.00
-10.00
-20.00
-30.00
0.00
50.00
100.00
150.00
TOTAL MILEAGE *10
GROUP 10 NO (NOT CORRECTED)

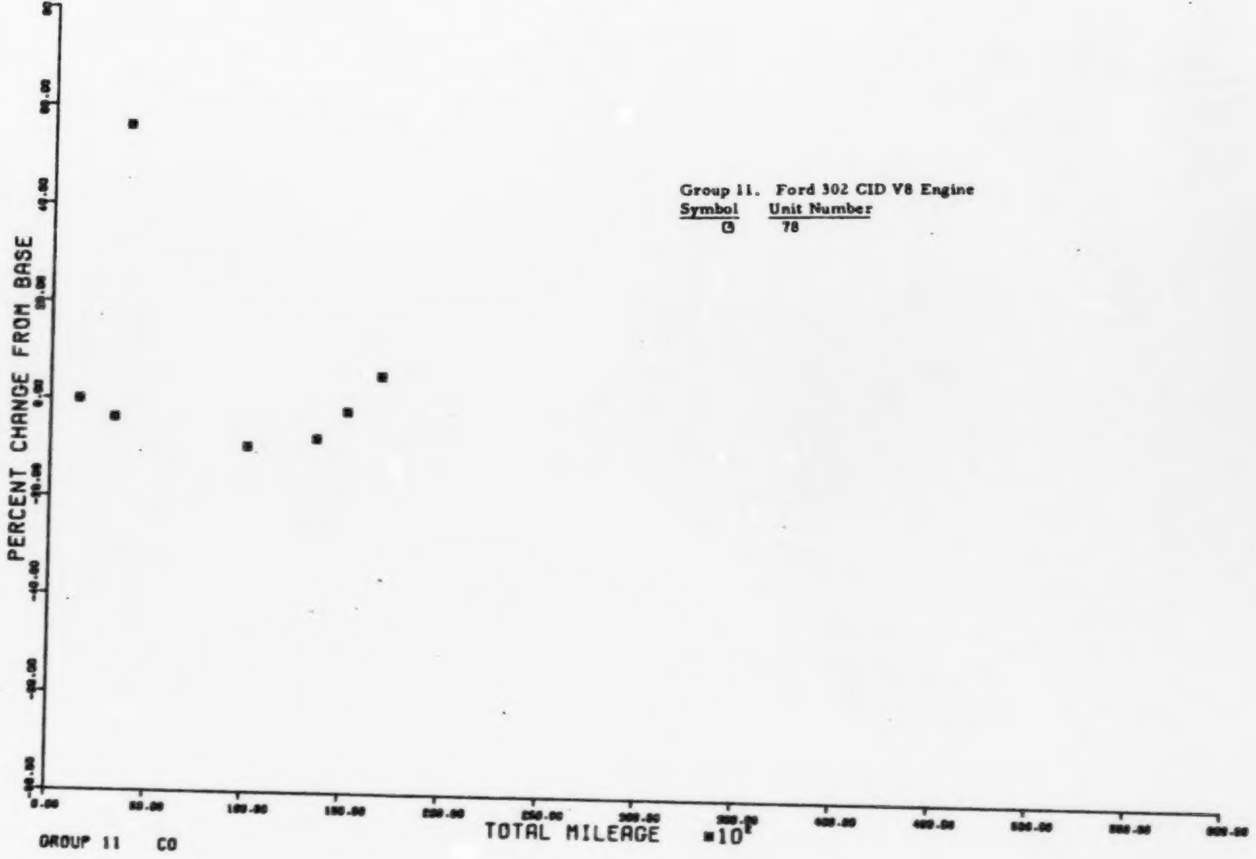


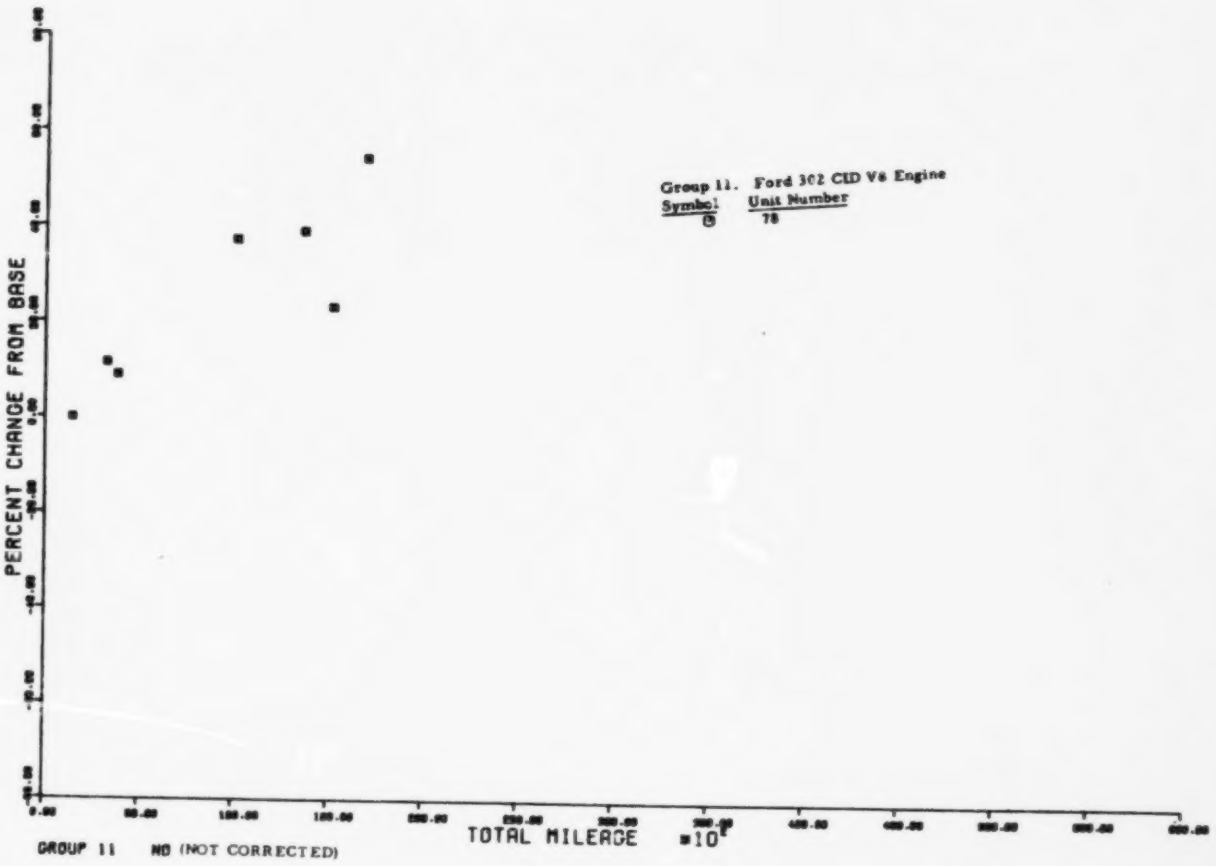
GROUP 10 NO CORRECTED

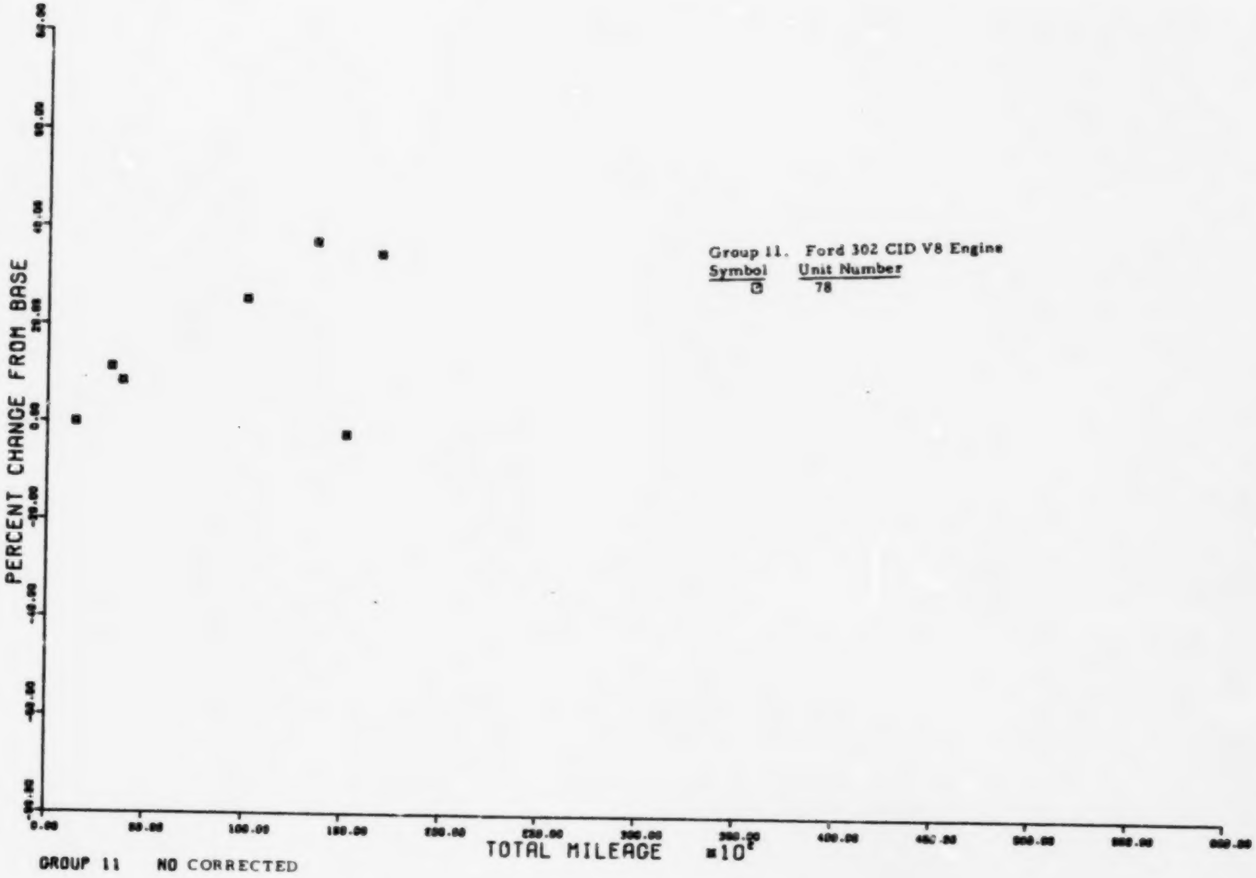


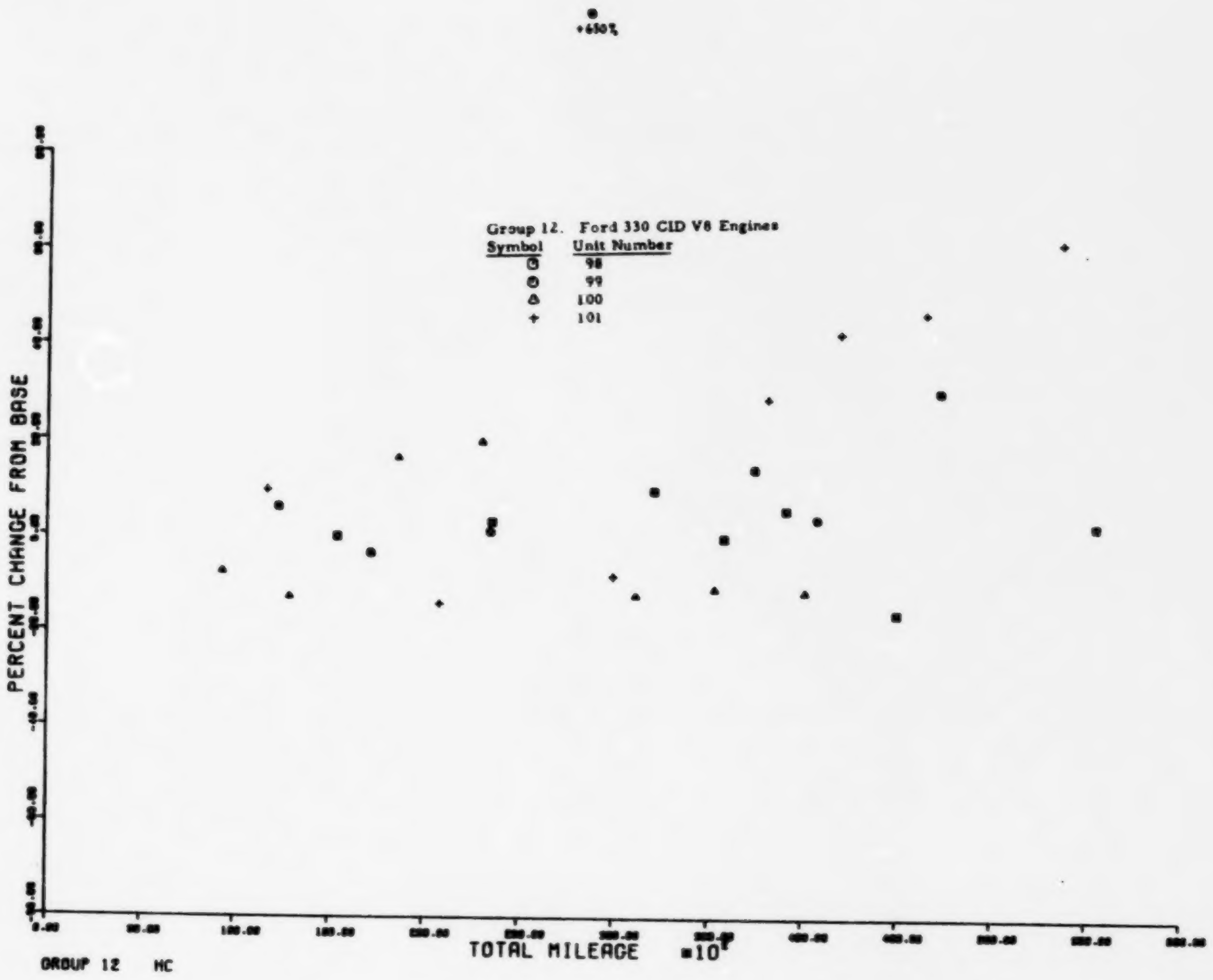
Group 11. Ford 302 CID V8 Engine

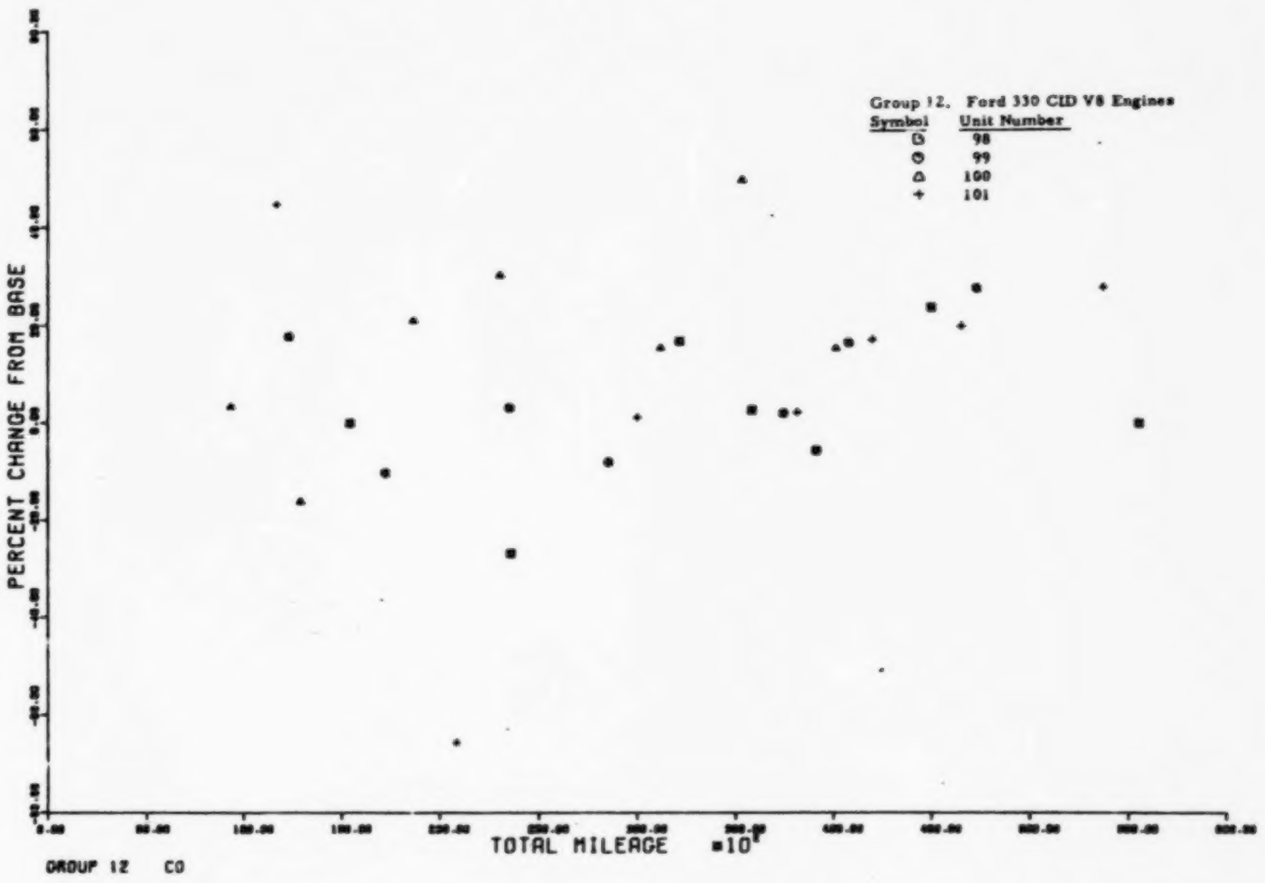
Symbol	Unit Number
▢	78

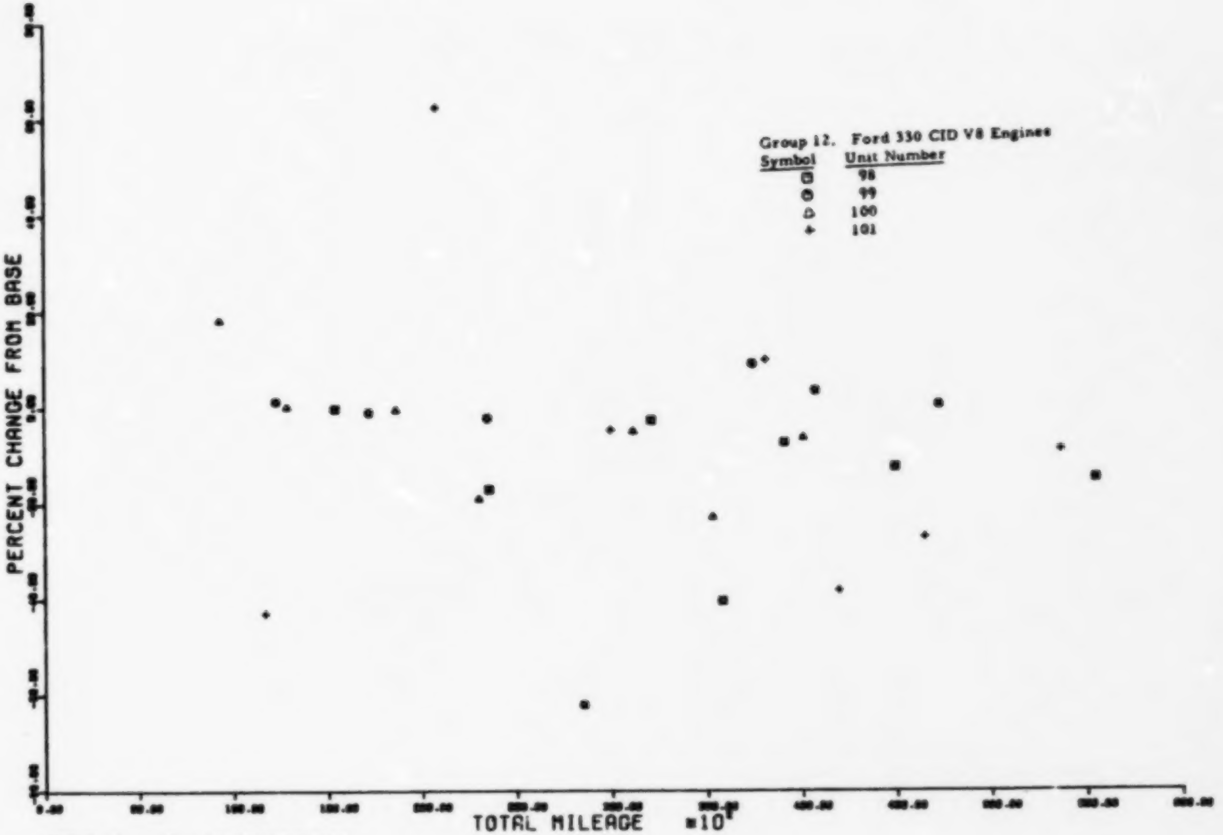

Group 11. Ford 302 CID V8 Engine
Symbol
Unit Number
78
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10
GROUP 11 CO


Group 11. Ford 302 CID V8 Engine
Symbol
Unit Number
78
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10²
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
GROUP 11 NO (NOT CORRECTED)

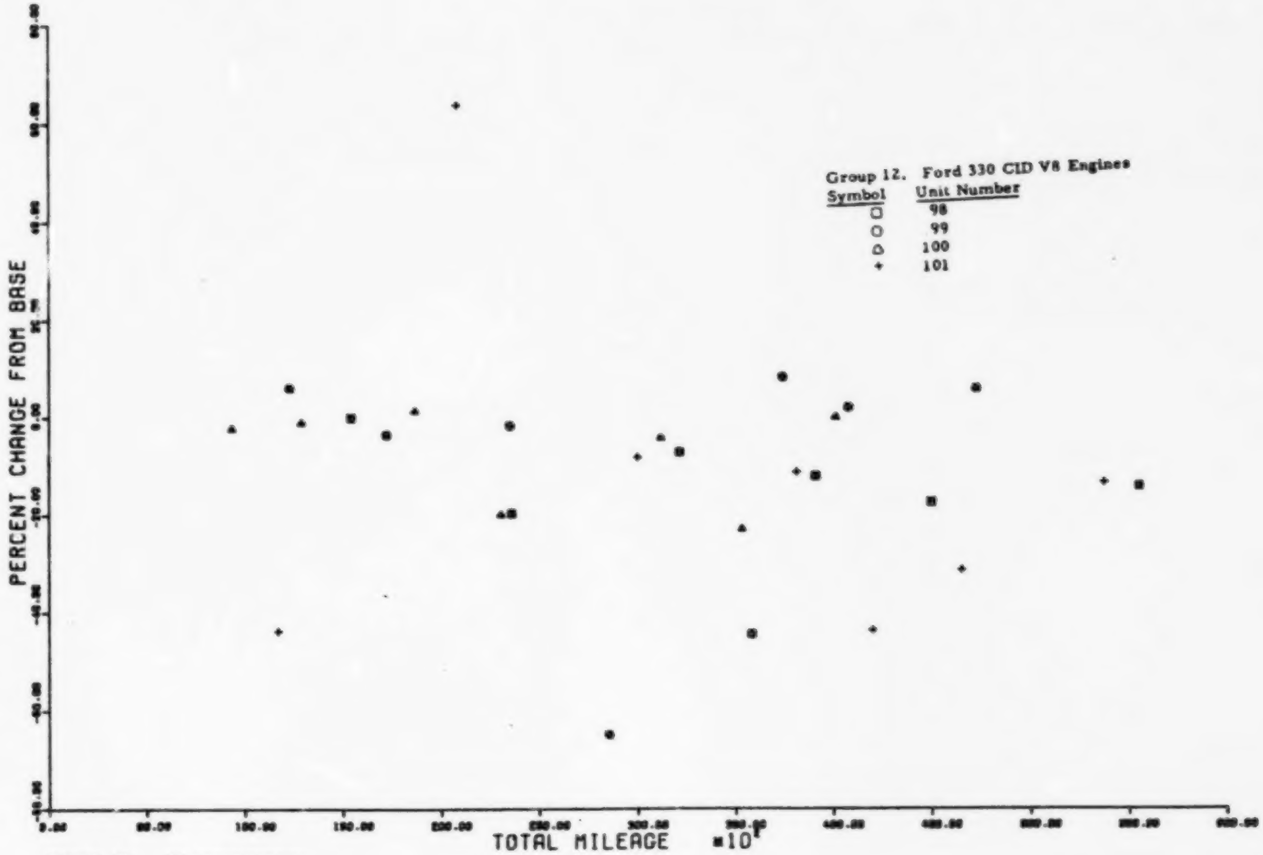

Group 11. Ford 302 CID V8 Engine
Symbol
Unit Number
78
PERCENT CHANGE FROM BASE
-80.00
-60.00
-40.00
-20.00
0.00
20.00
40.00
60.00
80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE ×10²
GROUP 11 NO CORRECTED


+630%
Group 12. Ford 330 CID V8 Engines
Symbol
Unit Number
98
99
100
101
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10
GROUP 12 HC

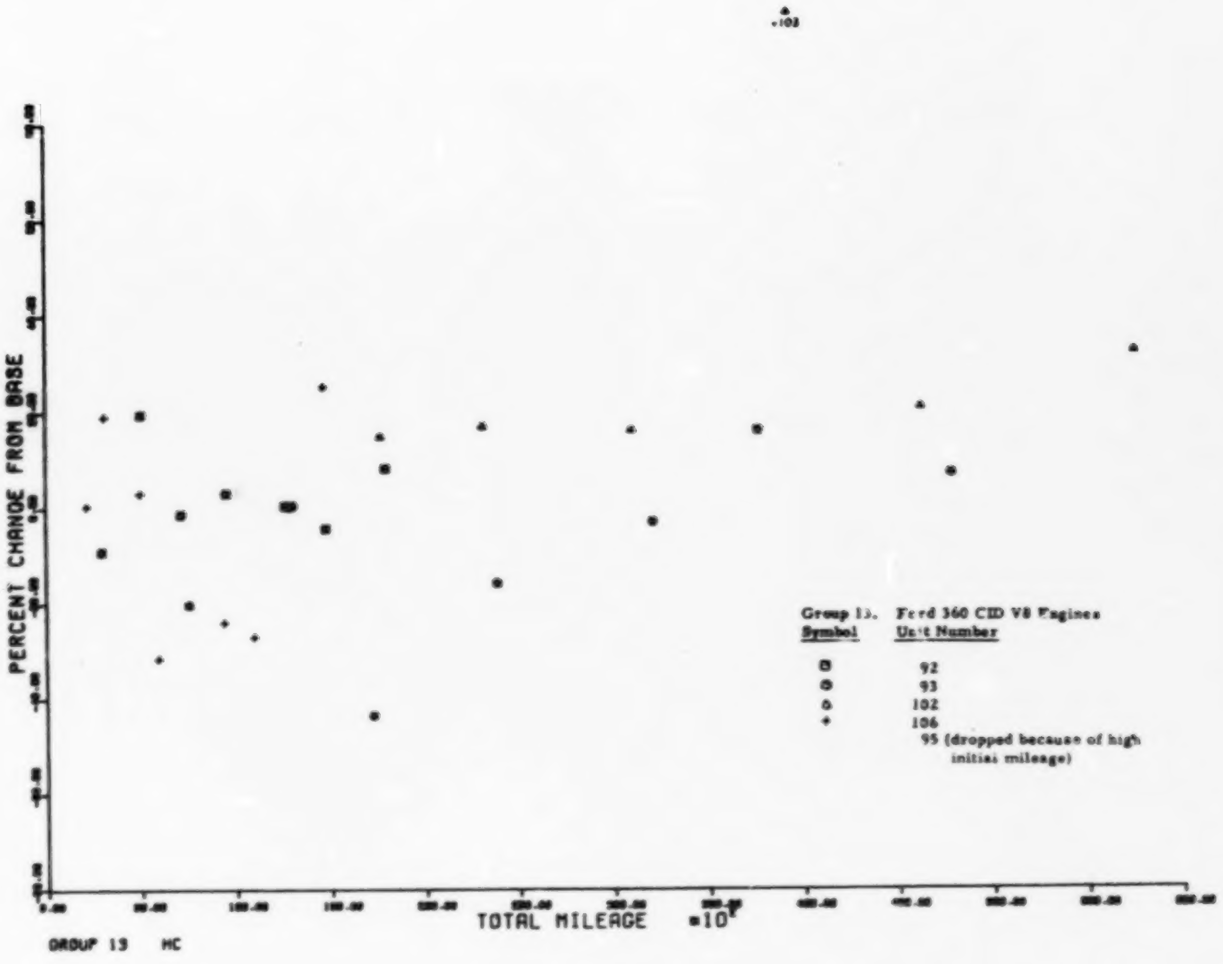
Group 12. Ford 330 CID V8 Engines
Symbol Unit Number
⊡ 98
⊙ 99
△ 100
+ 101
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE ×10²
GROUP 12 CO

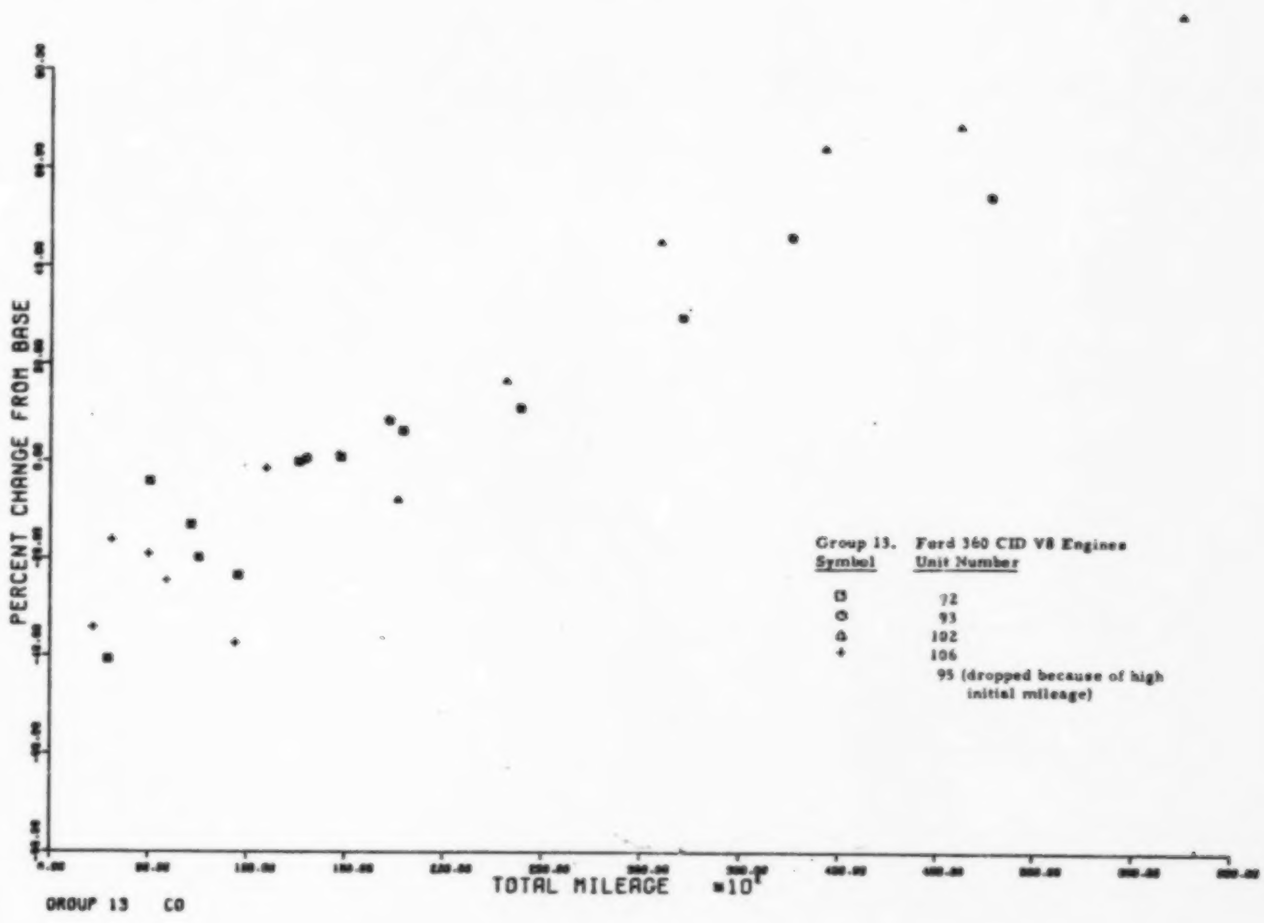


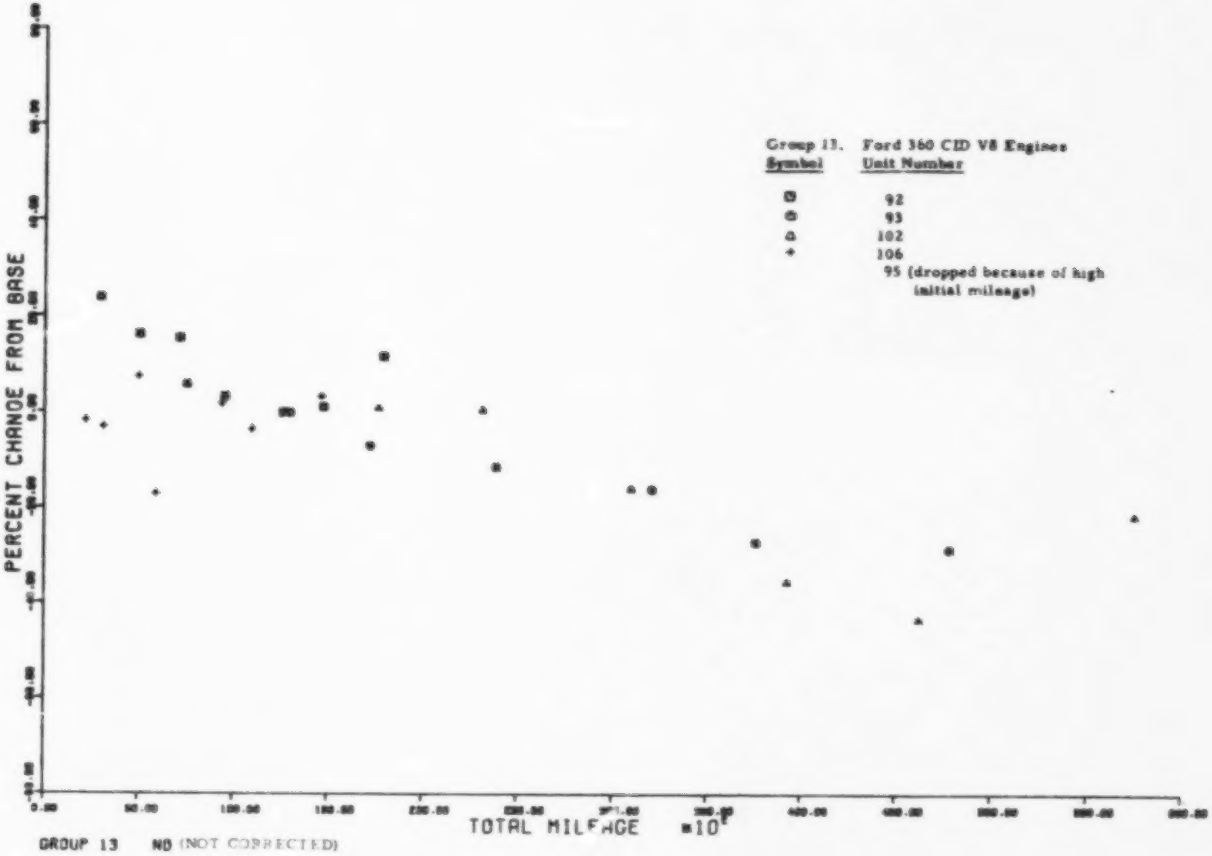
GROUP 12 NO (NOT CORRECTED)

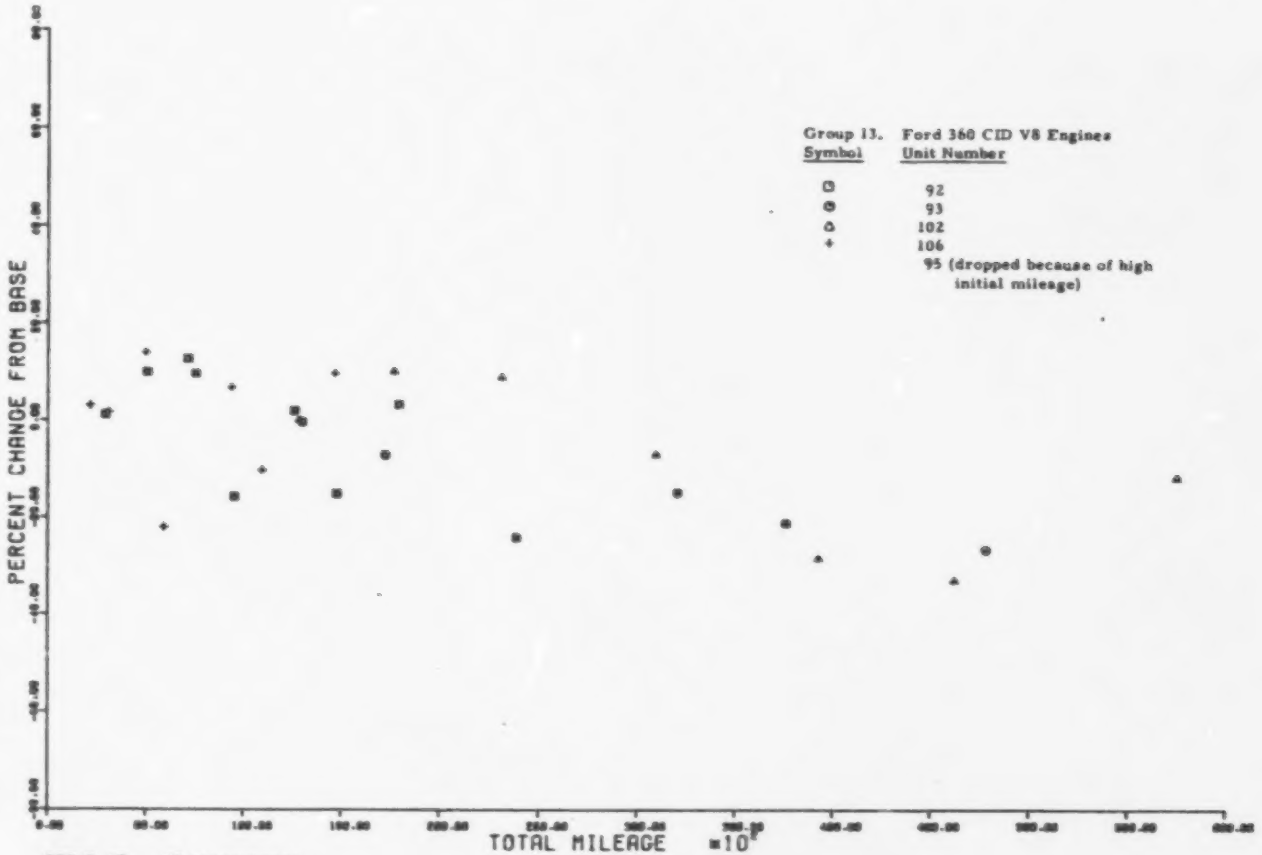


GROUP 12 NO CORRECTED

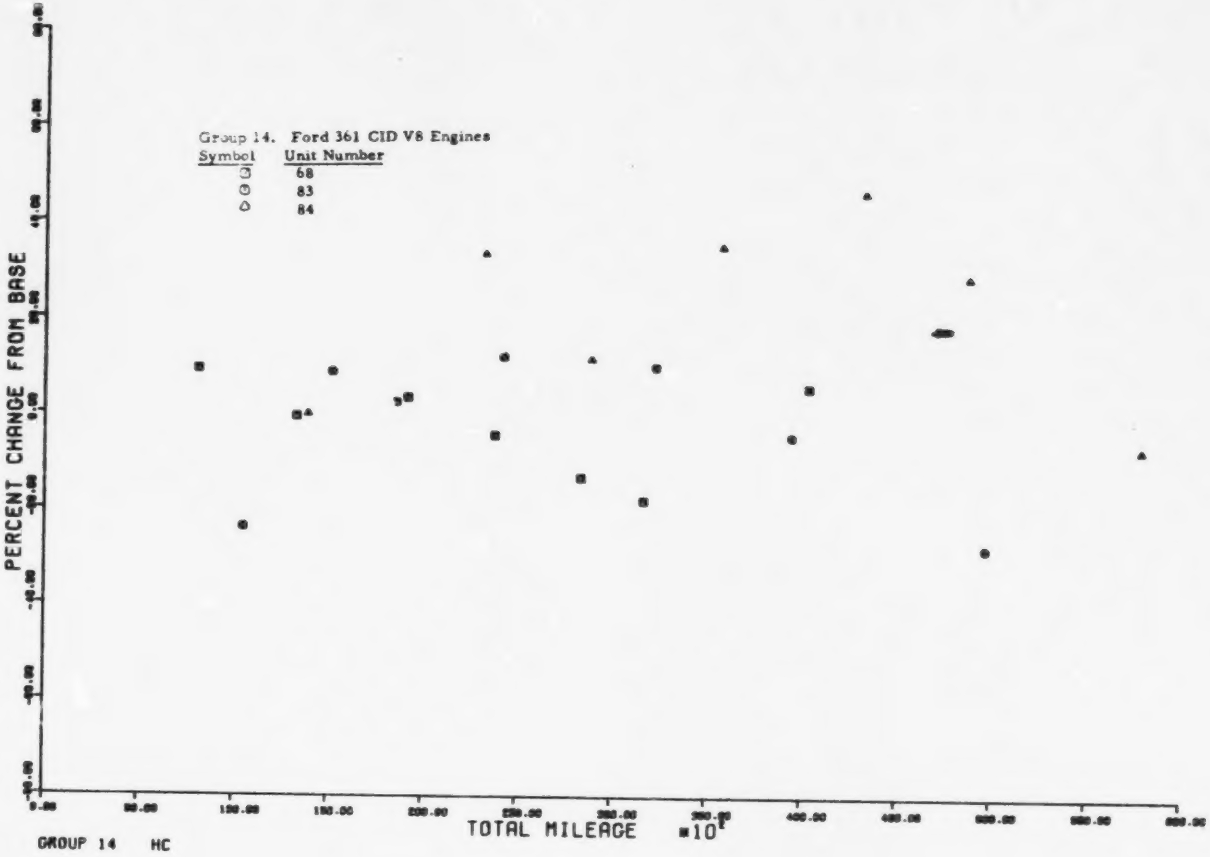

102
PERCENT CHANGE FROM BASE
TOTAL MILEAGE ×10³
GROUP 13 HC
Group 13. Ford 360 CID V8 Engines
Symbol Unit Number
□ 92
○ 93
△ 102
+ 106
95 (dropped because of high initial mileage)

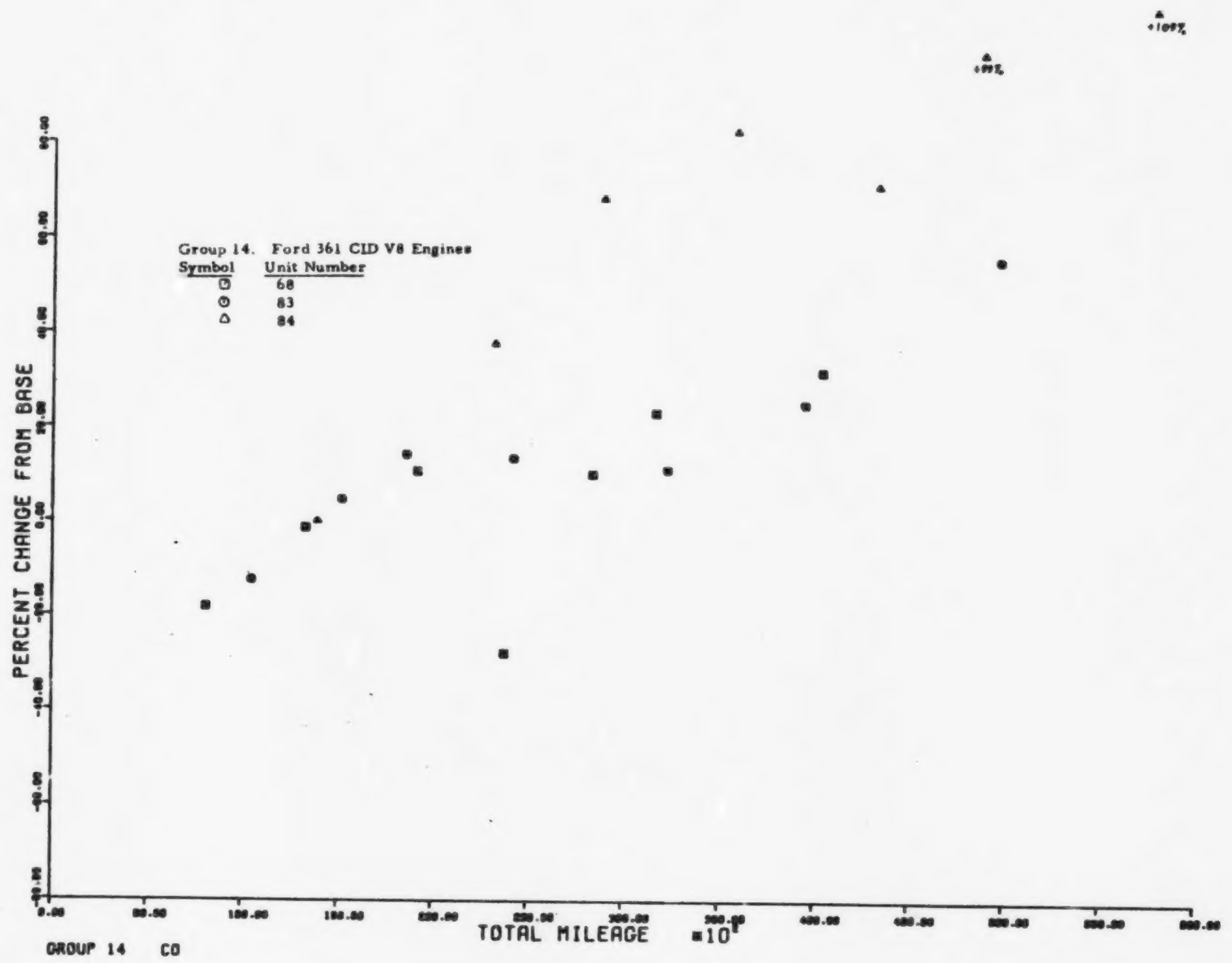

PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10
0.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
GROUP 13 CO
Group 13. Ford 360 CID V8 Engines
Symbol
Unit Number
□ 72
○ 93
△ 102
+ 106
95 (dropped because of high initial mileage)

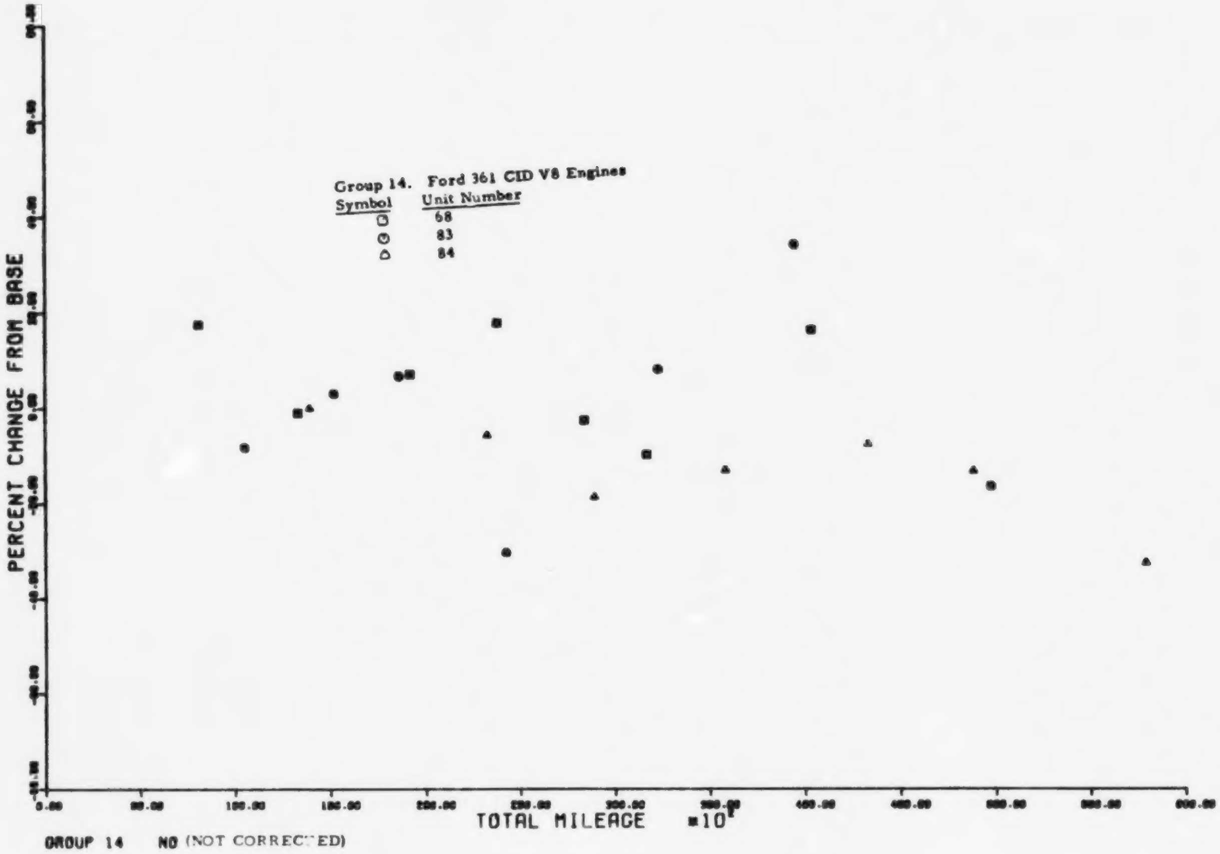

Group 13. Ford 360 CID V8 Engines
Symbol Unit Number
⊠ 92
⊙ 93
△ 102
+ 106
95 (dropped because of high initial mileage)
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10²
GROUP 13 NO (NOT CORRECTED)

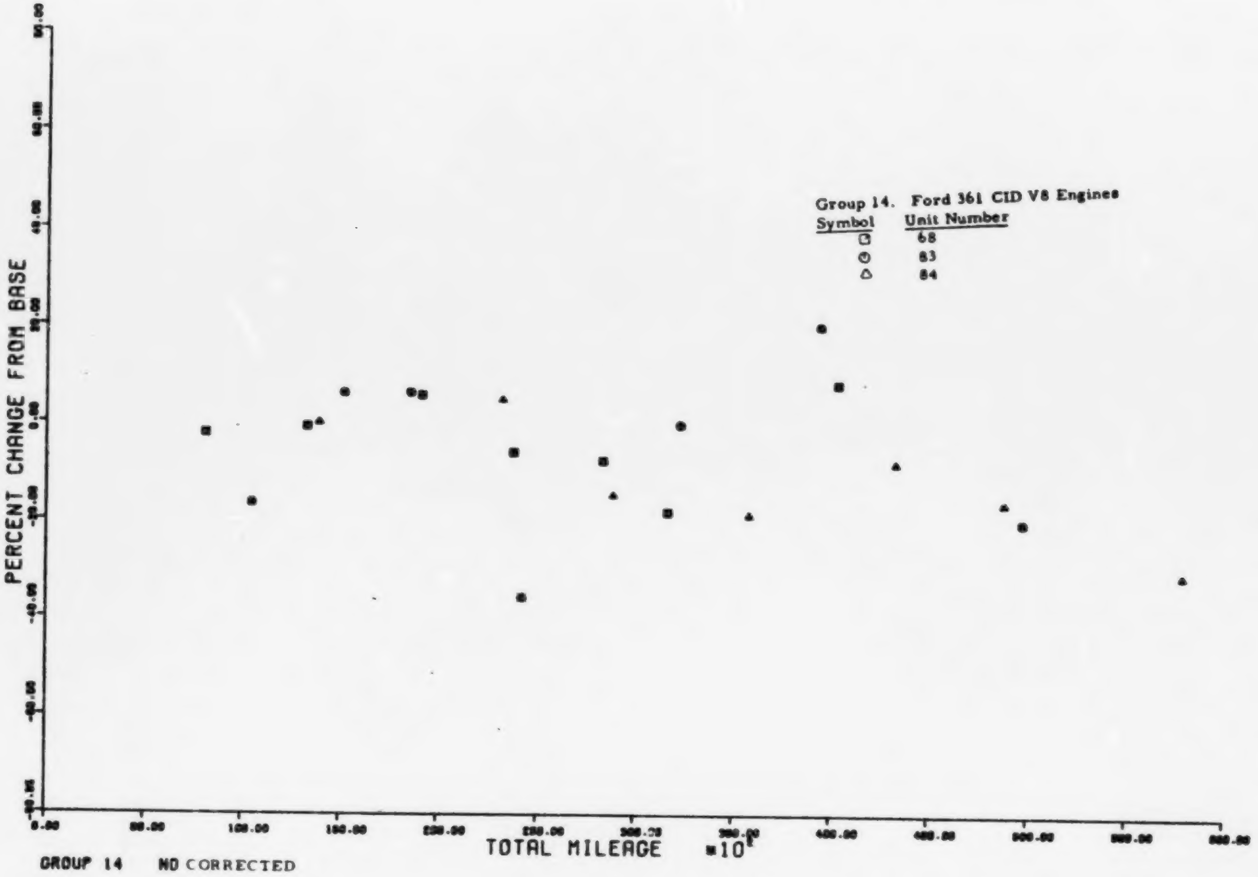


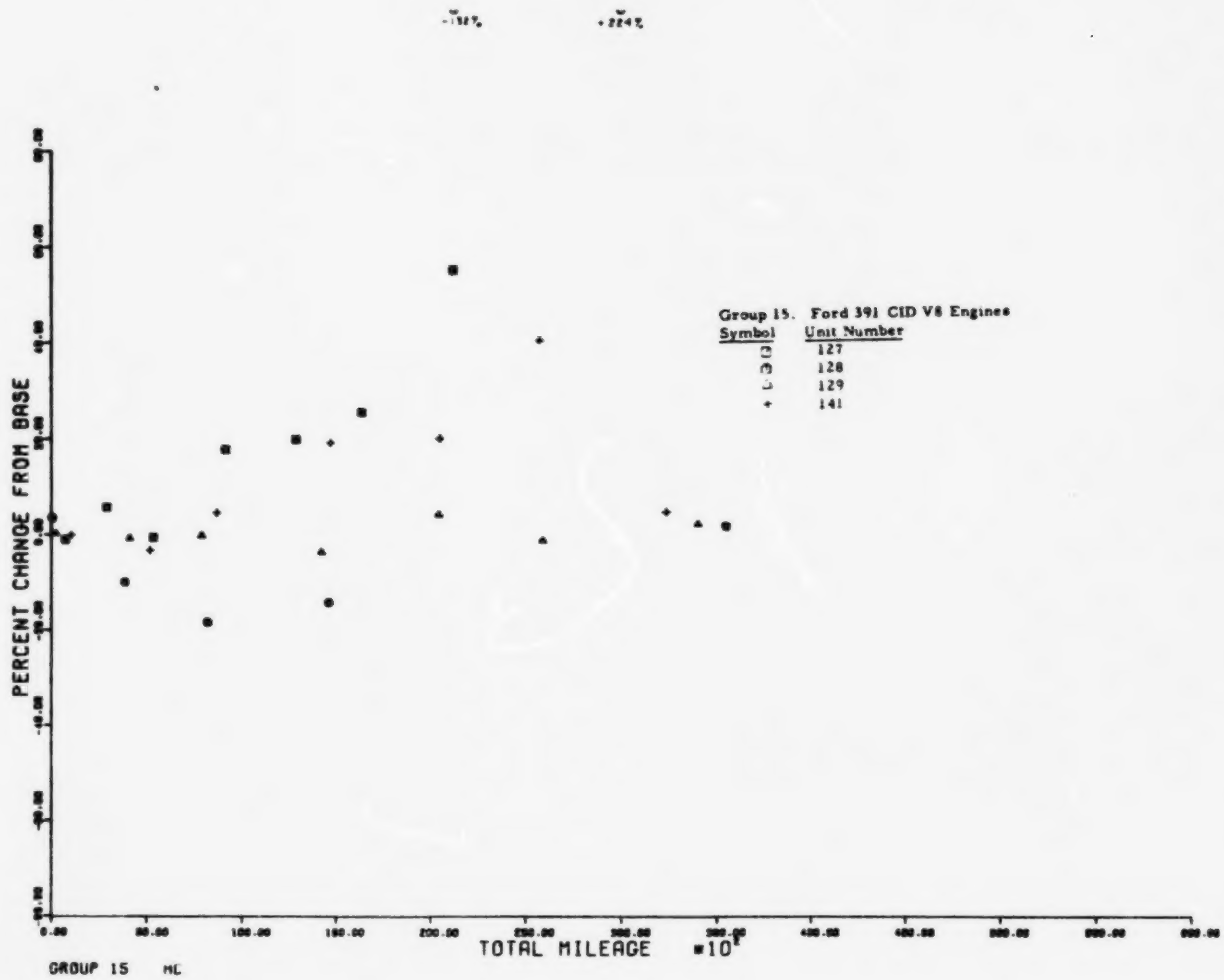
GROUP 13 HD CORRECTED

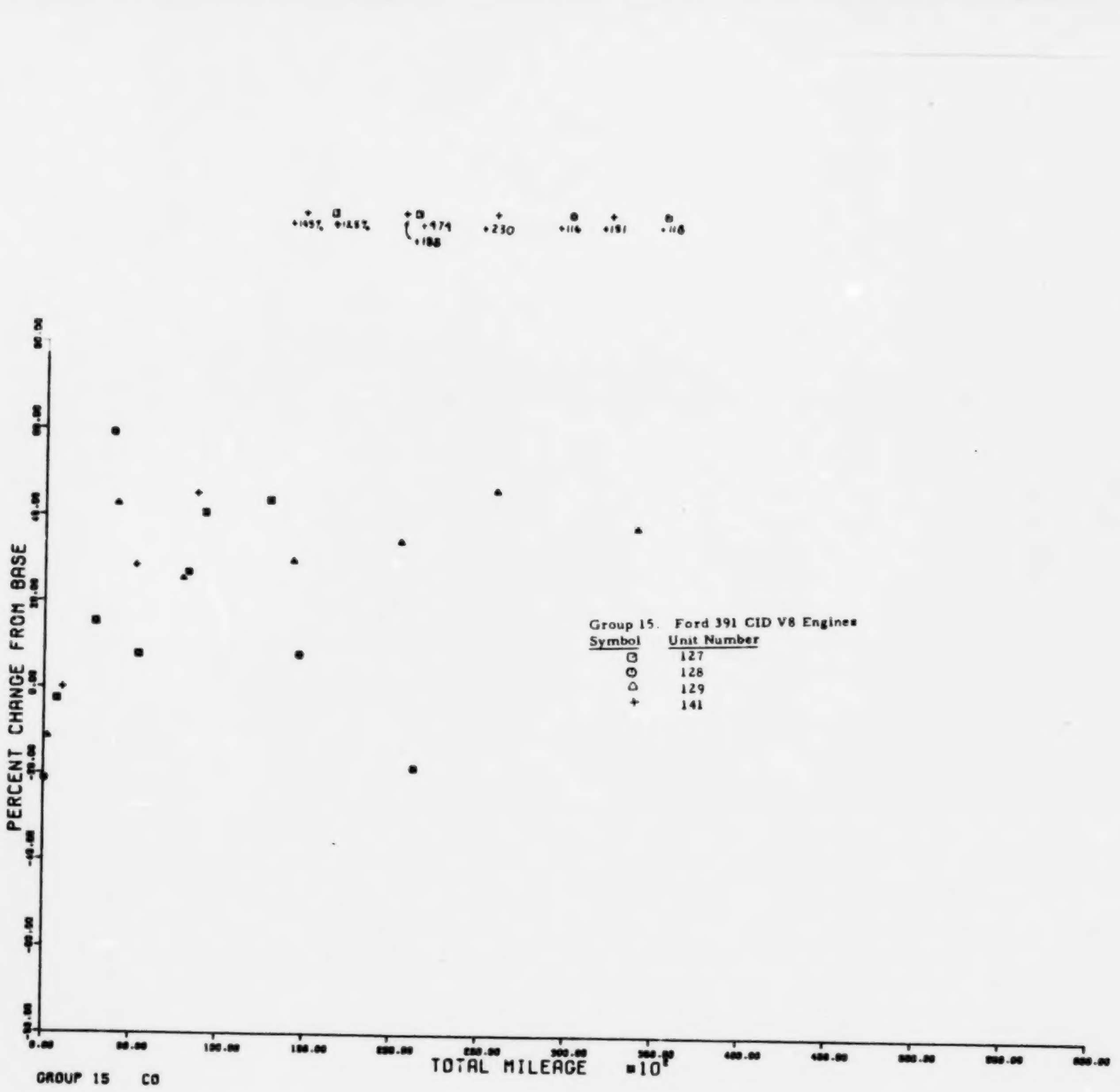

Group 14. Ford 361 CID V8 Engines
Symbol Unit Number
□ 68
⊙ 83
△ 84
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10²
GROUP 14 HC

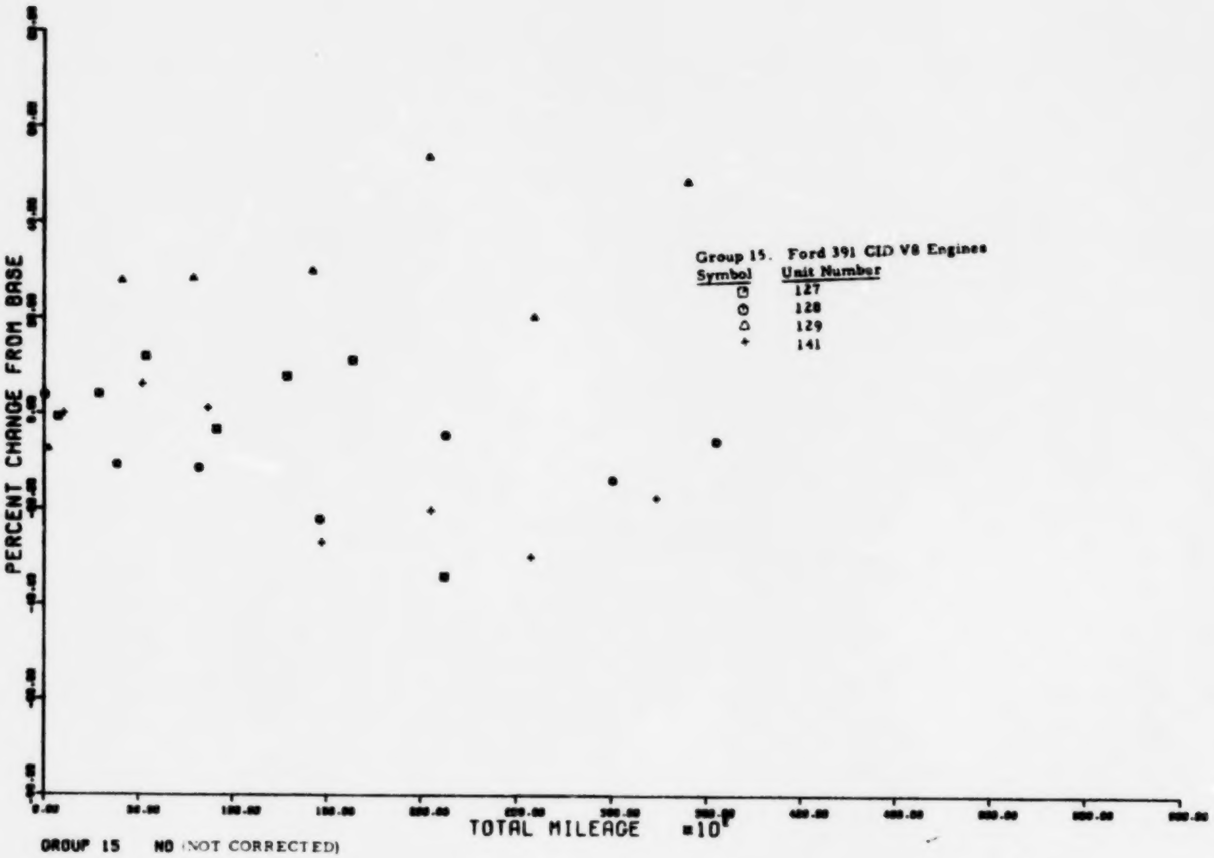

Group 14. Ford 361 CID V8 Engines
Symbol Unit Number
▢ 68
⊙ 83
△ 84
+109%
+109%
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE ×10³
GROUP 14 CO

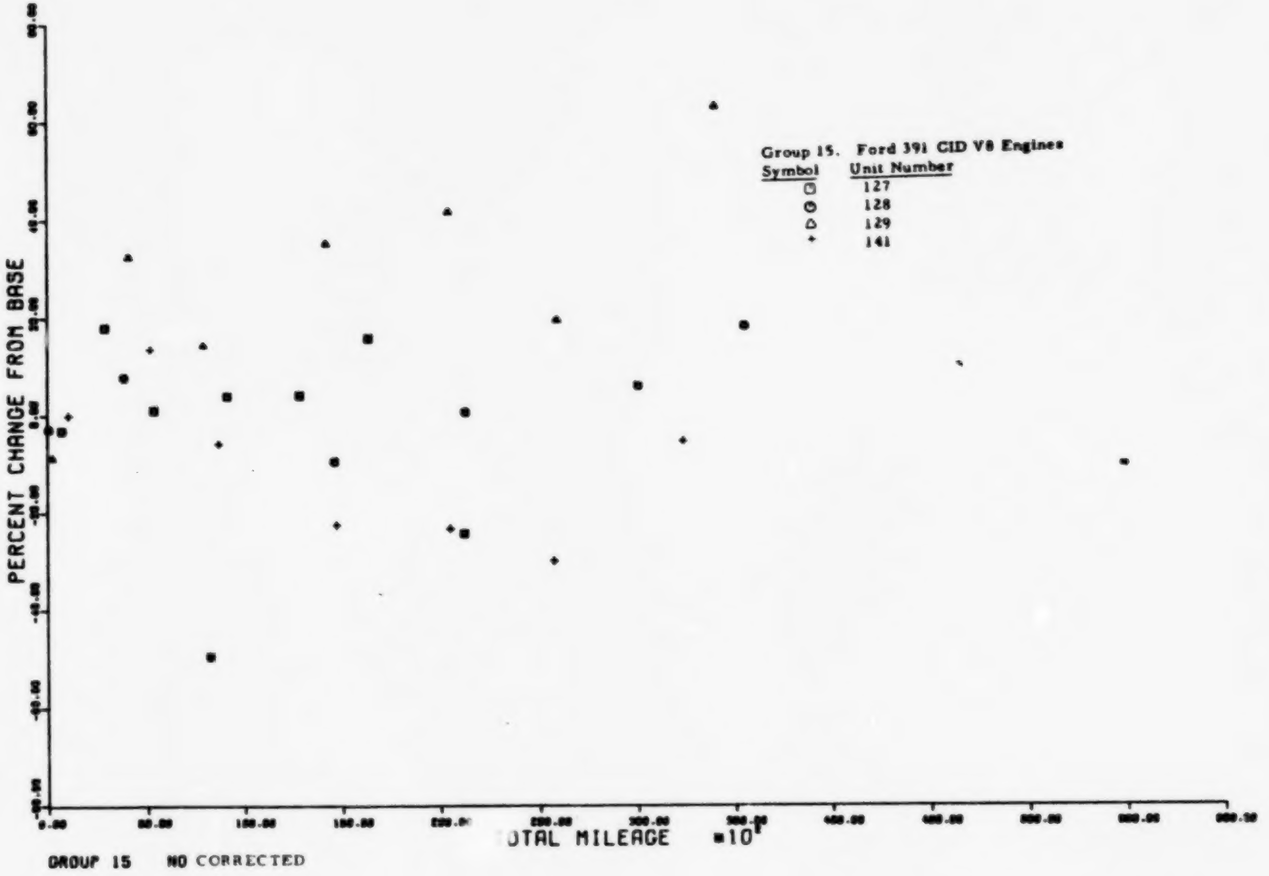

Group 14. Ford 361 CID V8 Engines
Symbol Unit Number
□ 68
⊙ 83
△ 84
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE ×10
GROUP 14 NO (NOT CORREC ED)


Group 14. Ford 361 CID V8 Engines
Symbol Unit Number
□ 68
⊙ 83
△ 84
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10³
GROUP 14 NO CORRECTED

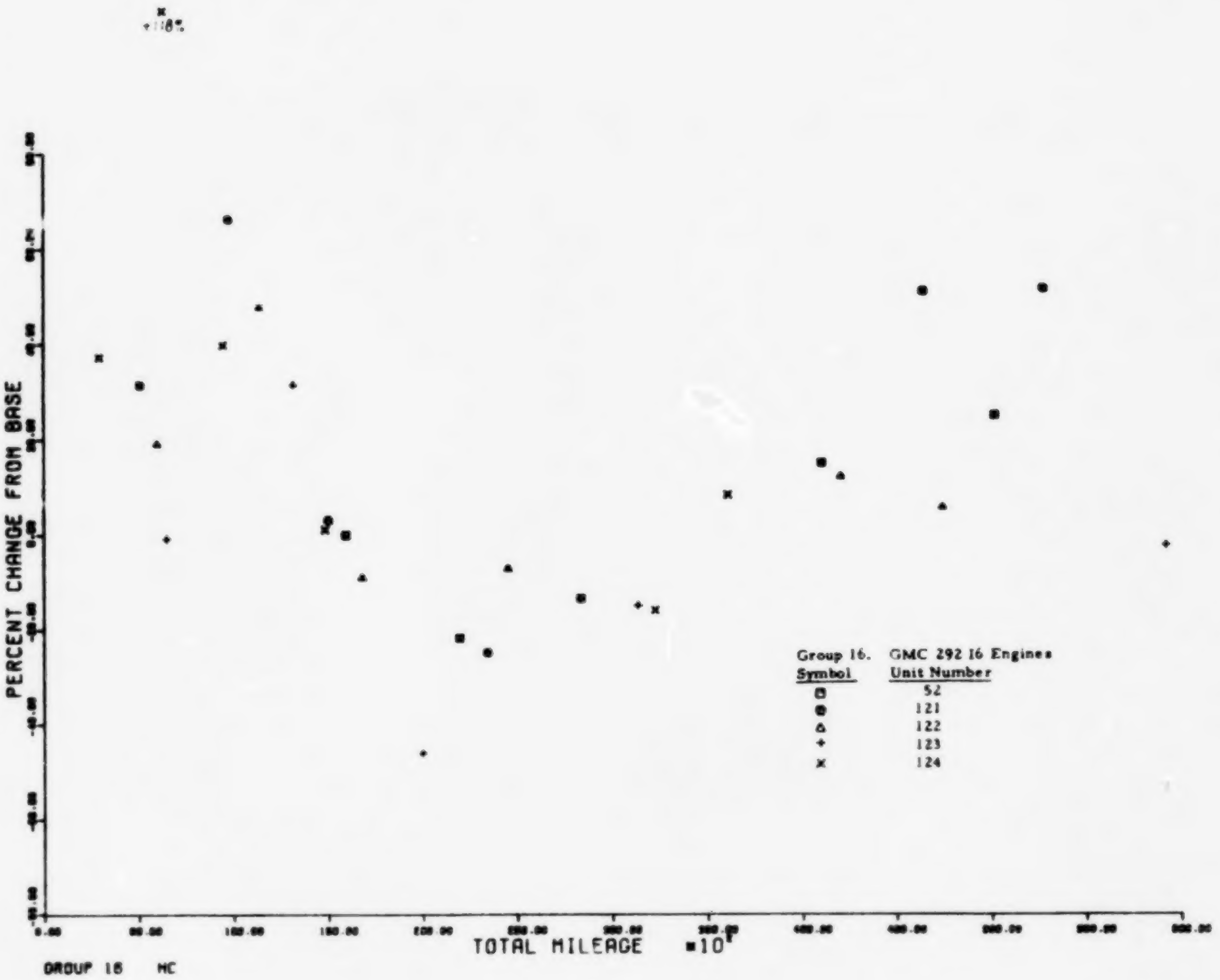

-132%
+224%
Group 15. Ford 391 CID V8 Engines
Symbol
Unit Number
□ 127
○ 128
△ 129
+ 141
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10³
GROUP 15 HC

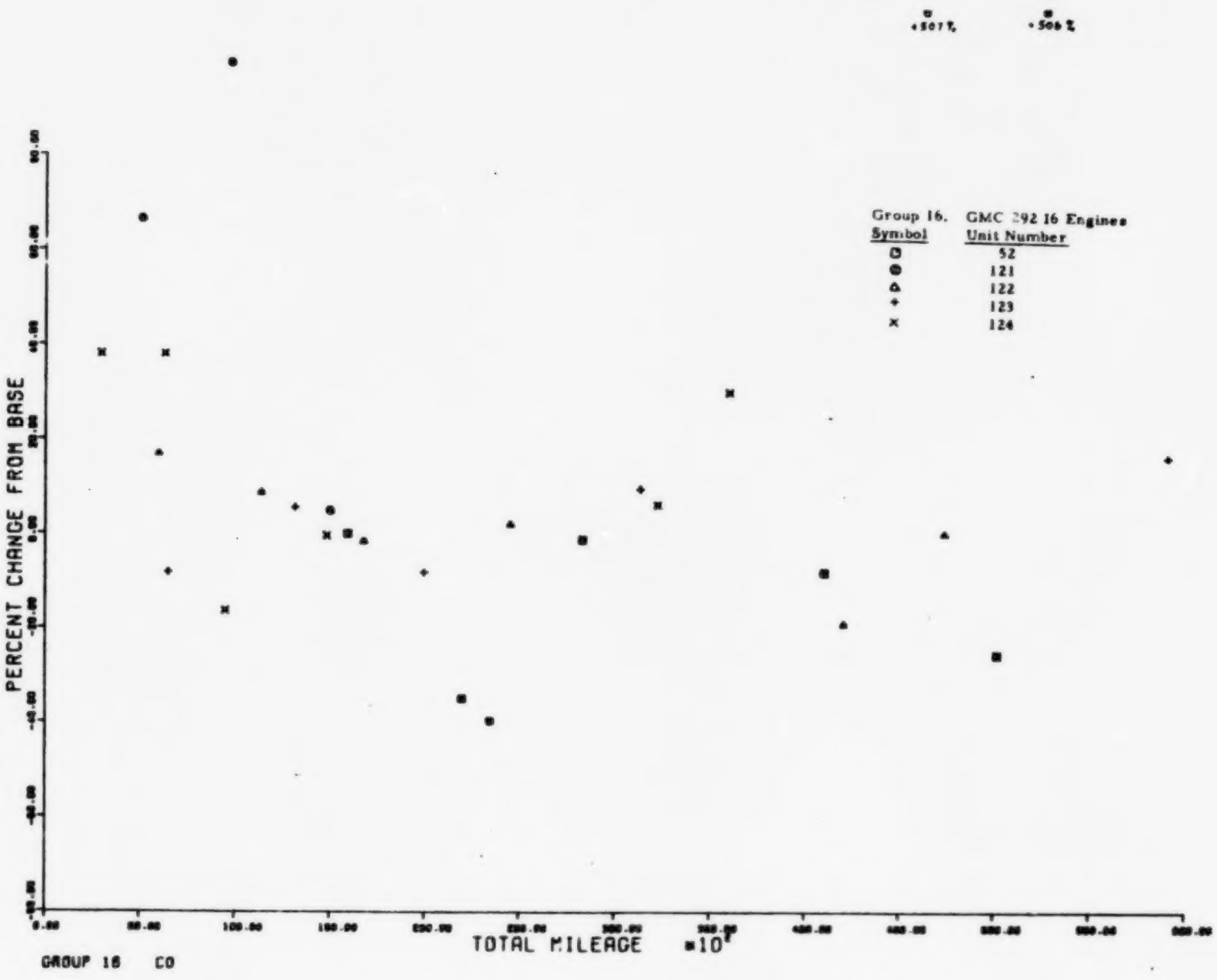

+1457% +1257%
+474
+188
+230
+116
+191
+118
PERCENT CHANGE FROM BASE
-60.00
-40.00
-20.00
0.00
20.00
40.00
60.00
80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE ×10²
GROUP 15 CO
Group 15. Ford 391 CID V8 Engines
Symbol Unit Number
□ 127
○ 128
△ 129
+ 141

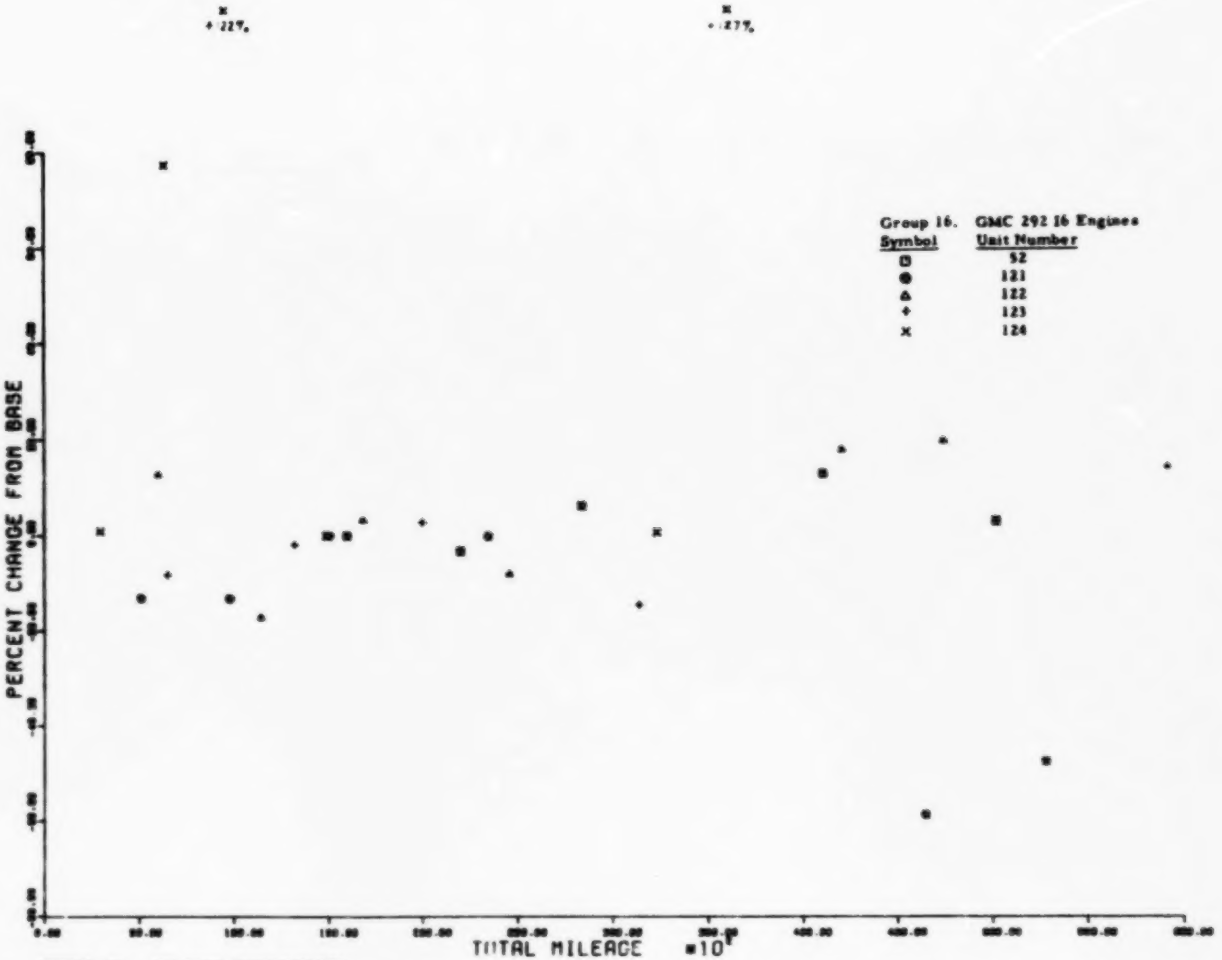

Group 15. Ford 391 CID V8 Engines
Symbol | Unit Number
■ 127
● 128
▲ 129
+ 141
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10
GROUP 15 NO (NOT CORRECTED)



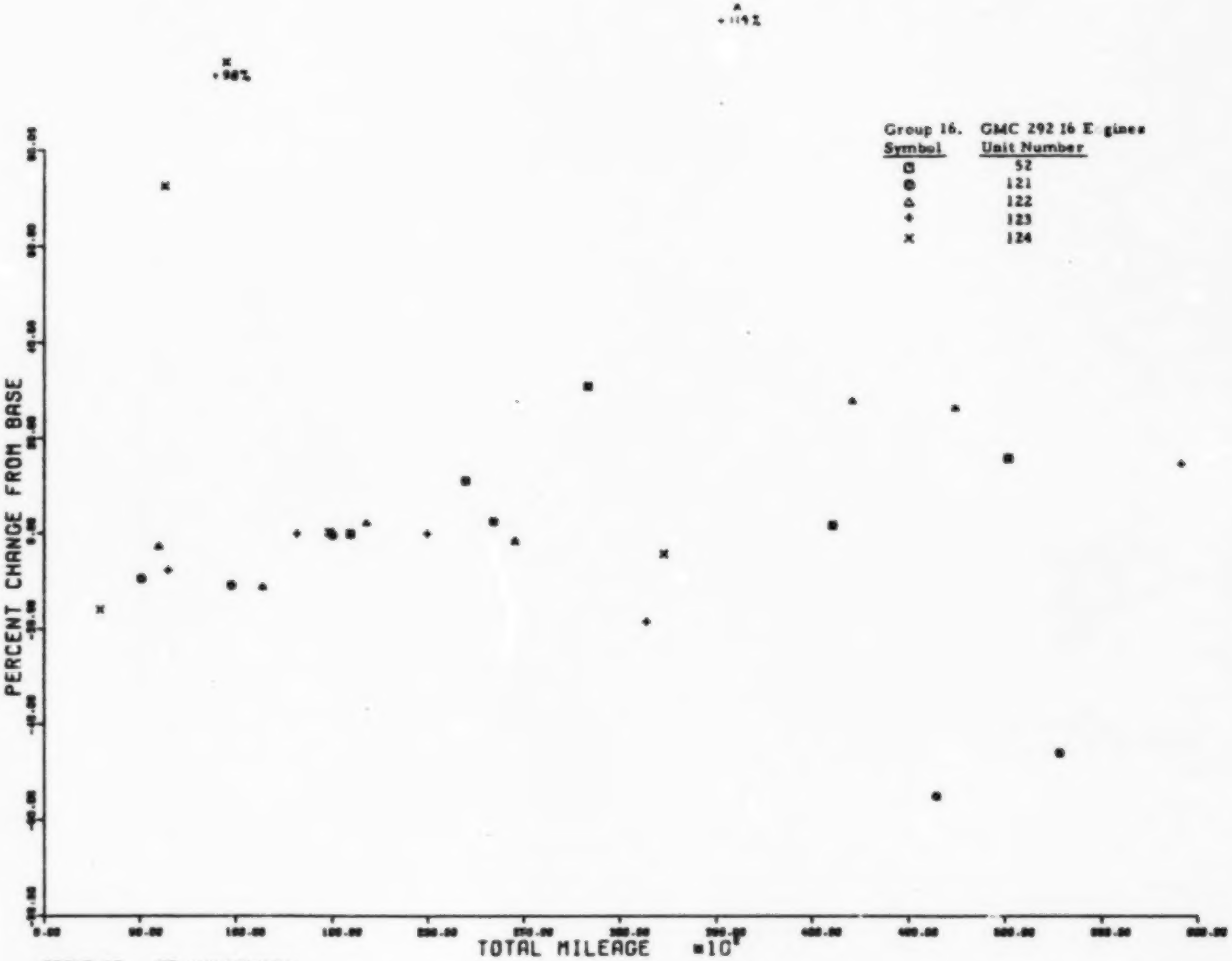
Group 15. Ford 391 CID V8 Engines


+118%
PERCENT CHANGE FROM BASE
0.00
100.00
150.00
TOTAL MILEAGE *10
GROUP 16 HC
Group 16. GMC 292 I6 Engines
Symbol
Unit Number
□ 52
● 121
△ 122
+ 123
× 124

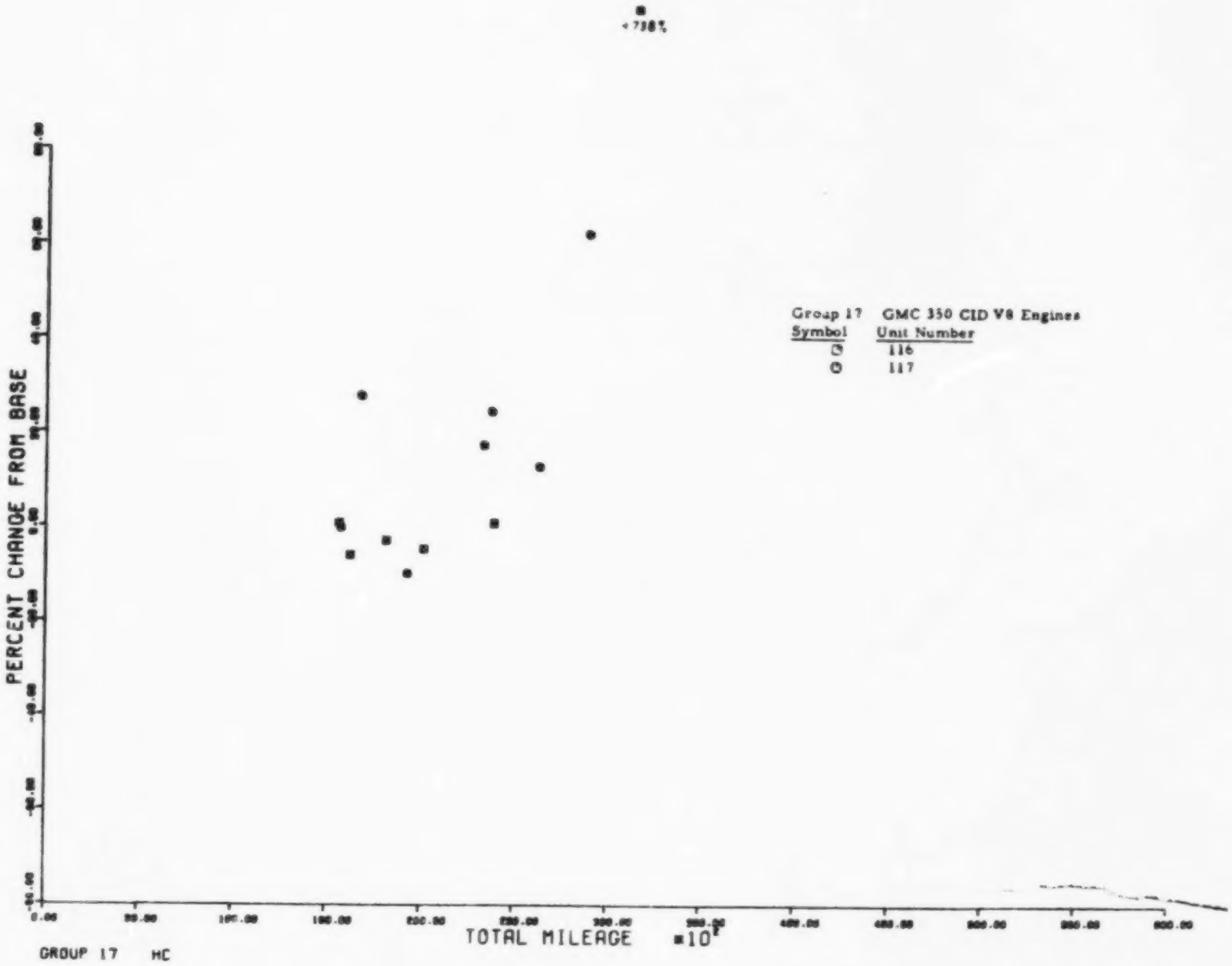
+507%
+506%
Group 16. GMC 292 16 Engines
Symbol
Unit Number
□ 52
● 121
△ 122
+ 123
× 124
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE ×10²
GROUP 16 CO

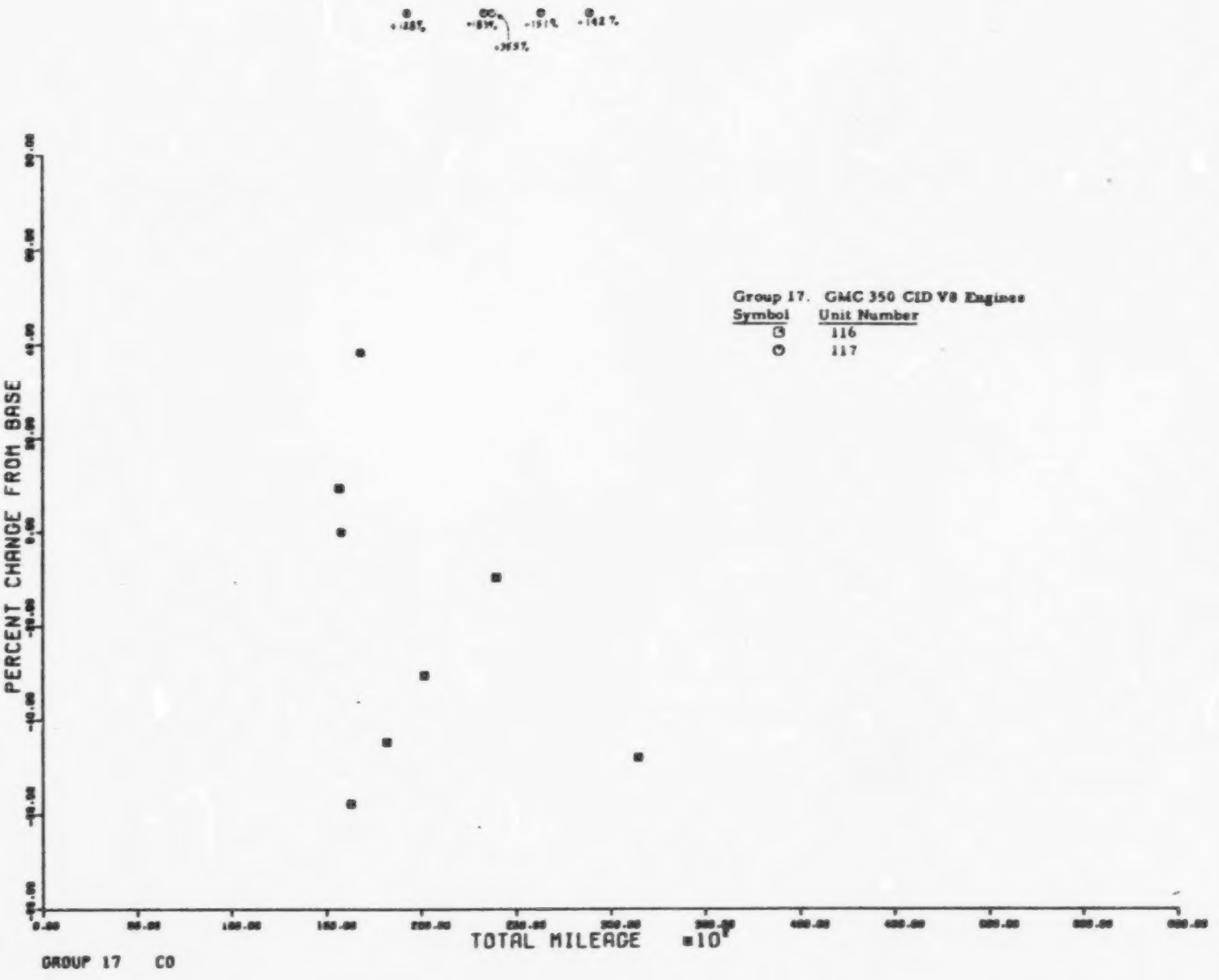


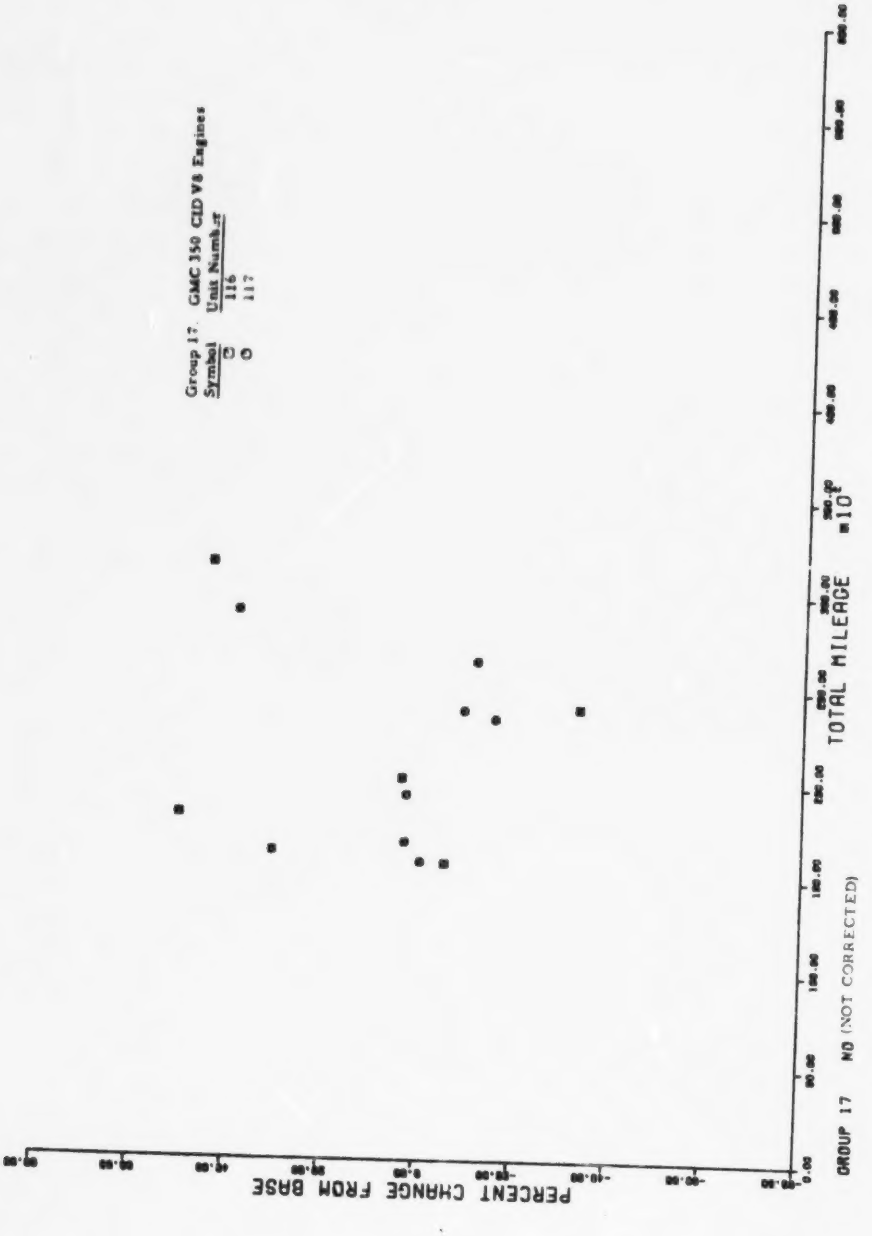
GROUP 16 NO (NOT CORRECTED)

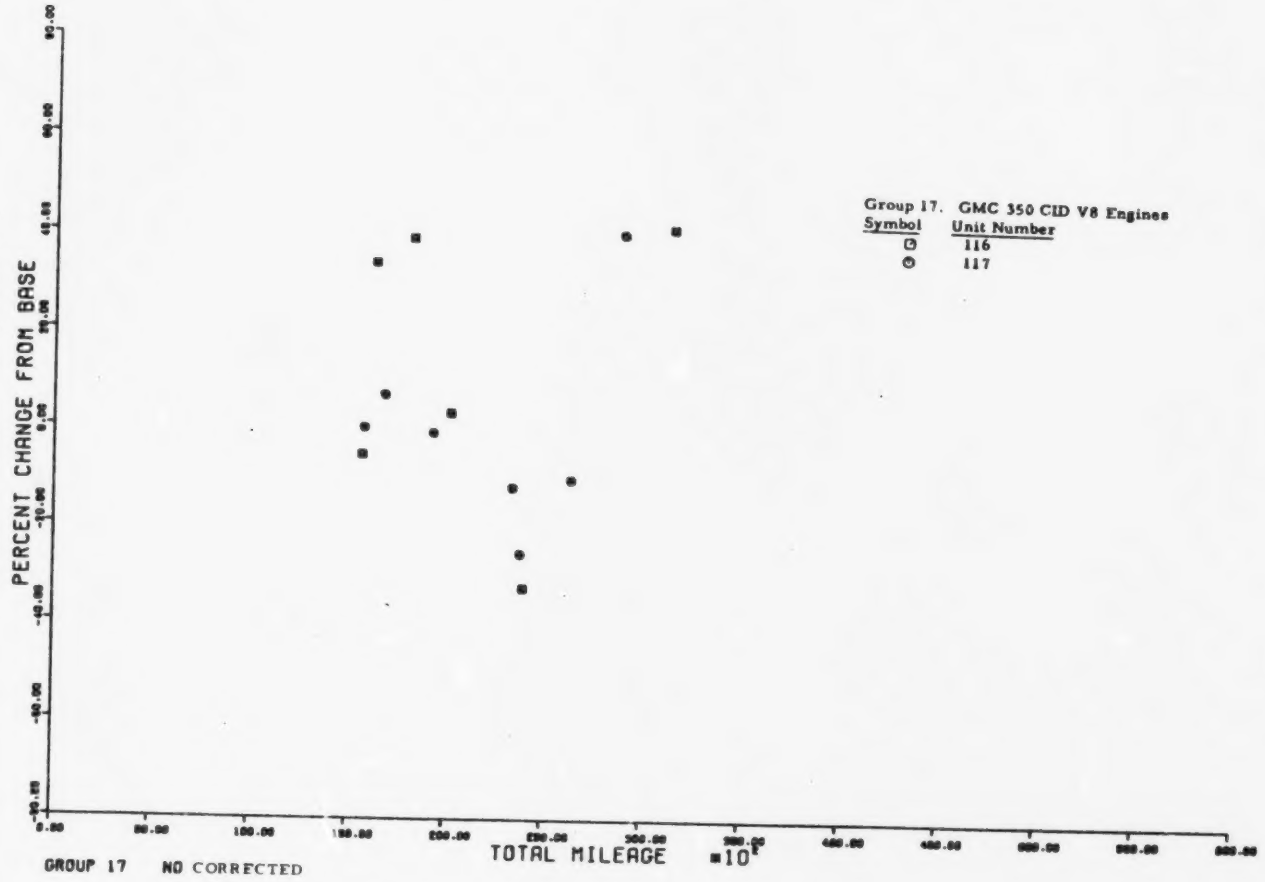


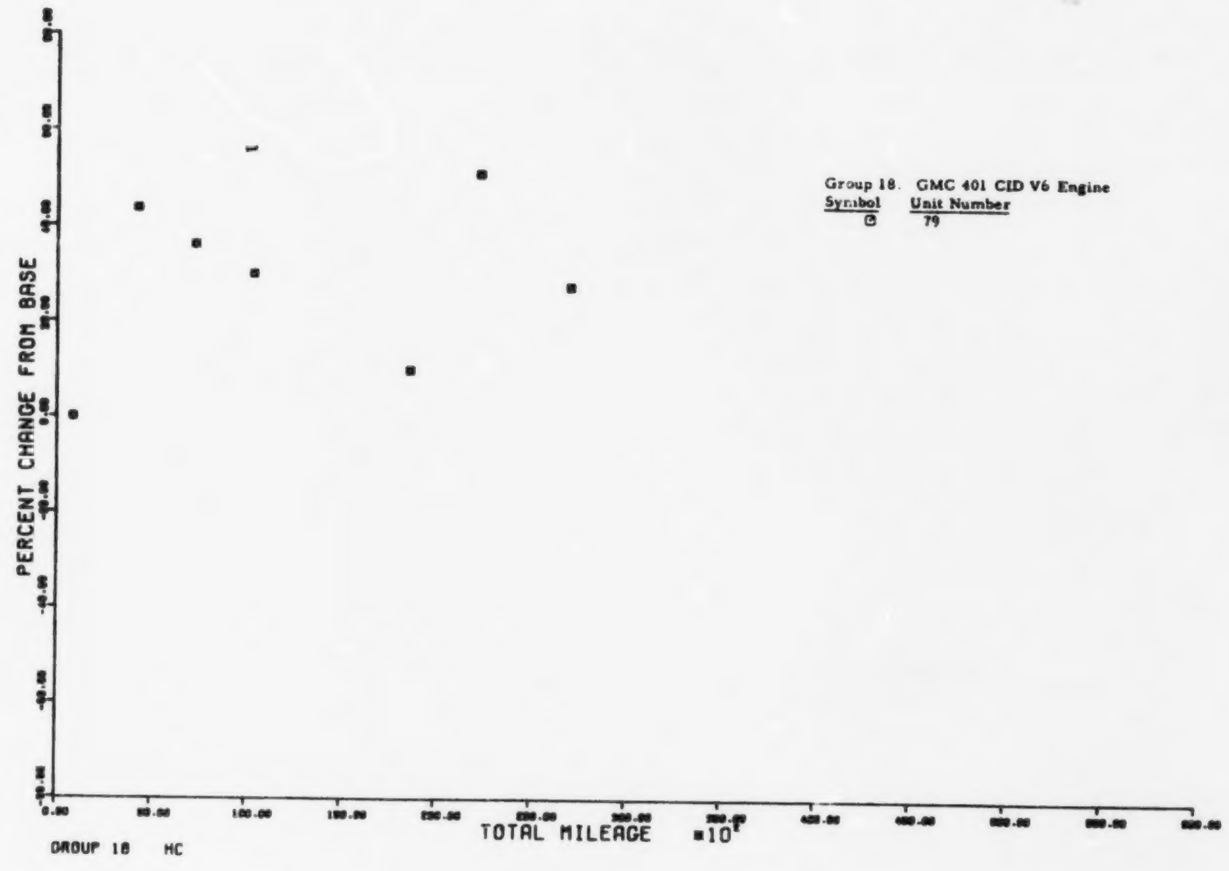
GROUP 15 NO CORRECTED


+738%
Group 17 GMC 350 CID V8 Engines
Symbol Unit Number
▣ 116
⊙ 117
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE $*10^{2}$
GROUP 17 HC


+128%
+83%
+365%
+151%
+142%
Group 17. GMC 350 CID V8 Engines
Symbol Unit Number
⊡ 116
⊙ 117
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE ×10³
GROUP 17 CO

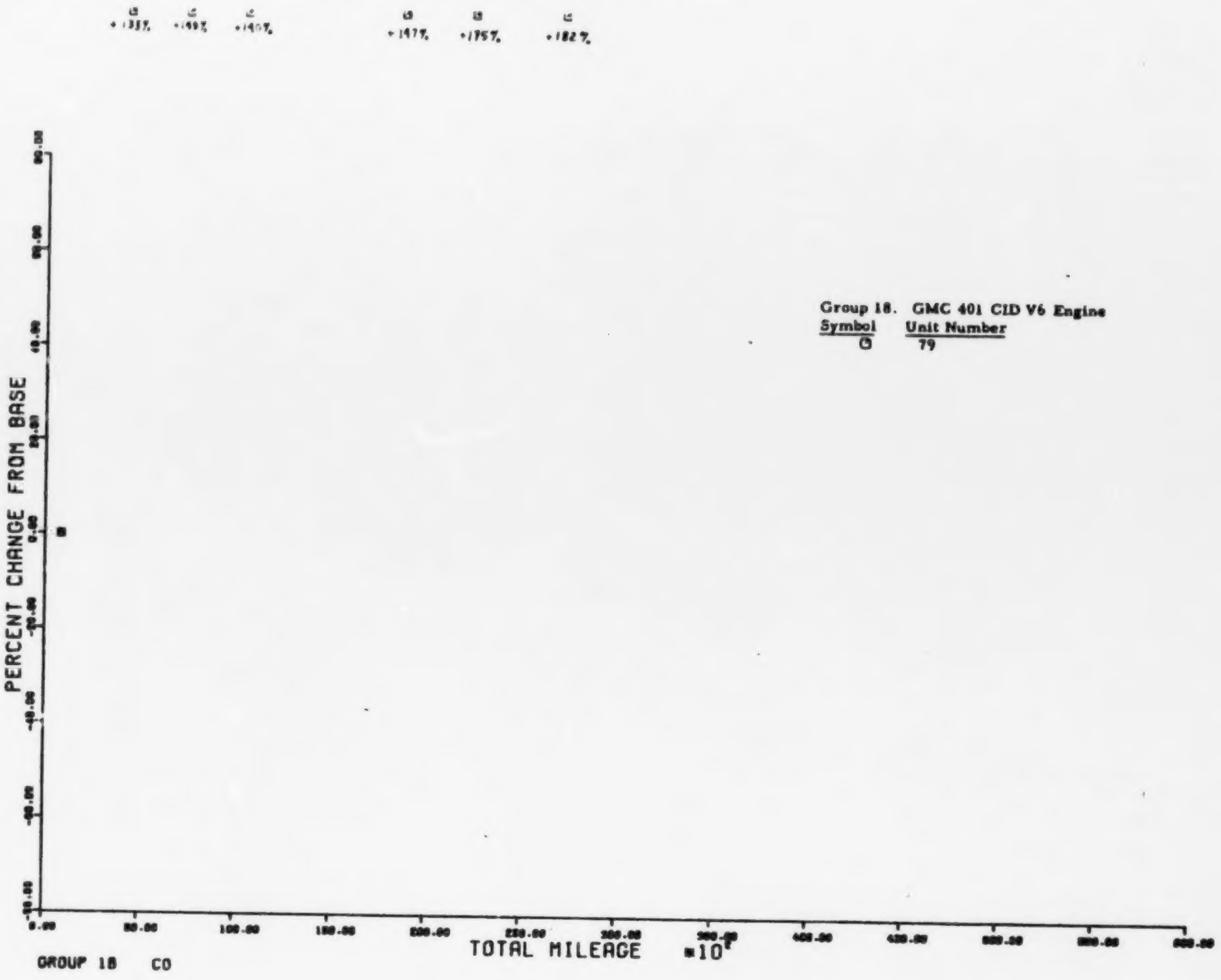

Group 17. GMC 350 CID V8 Engines
Symbol Unit Number
□ 116
○ 117
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10²
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
GROUP 17 NO (NOT CORRECTED)

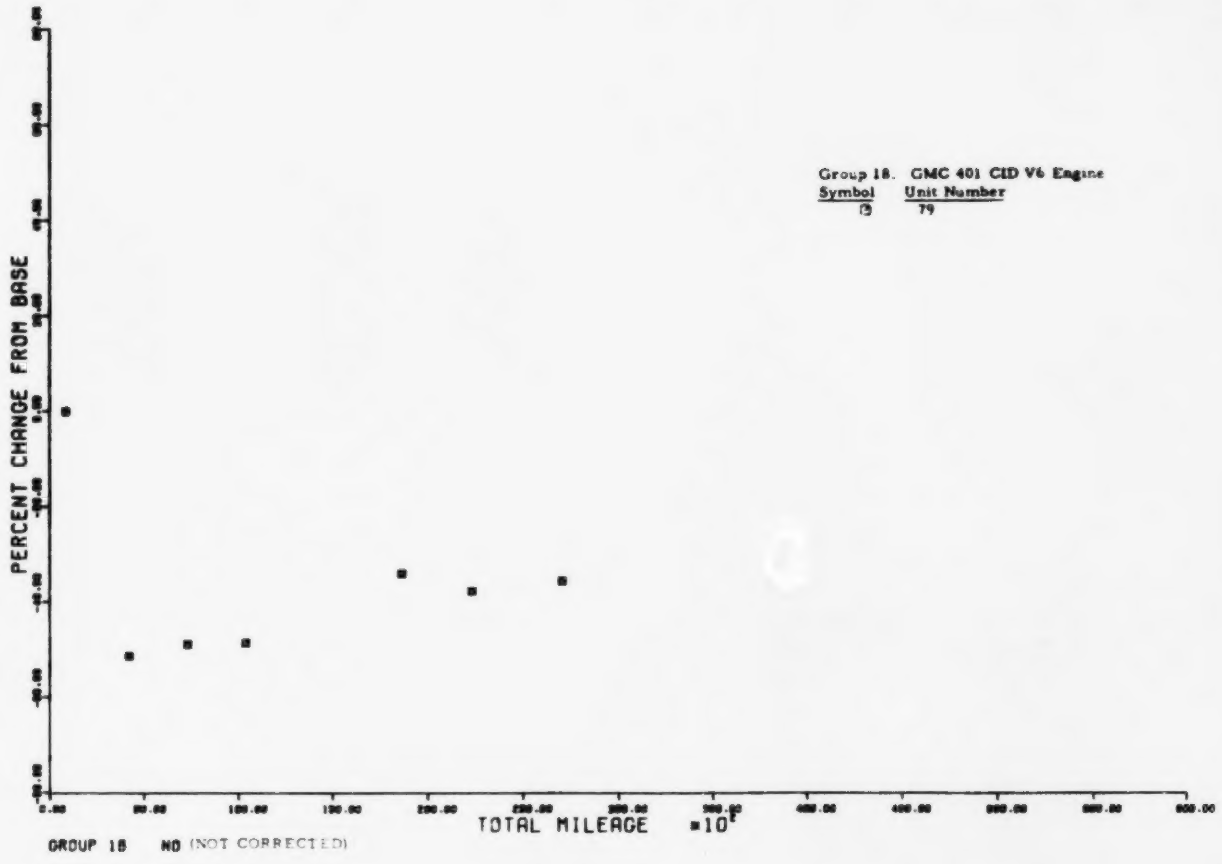

Group 17. GMC 350 CID V8 Engines
Symbol
Unit Number
■ 116
● 117
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10^{3}
GROUP 17 NO CORRECTED

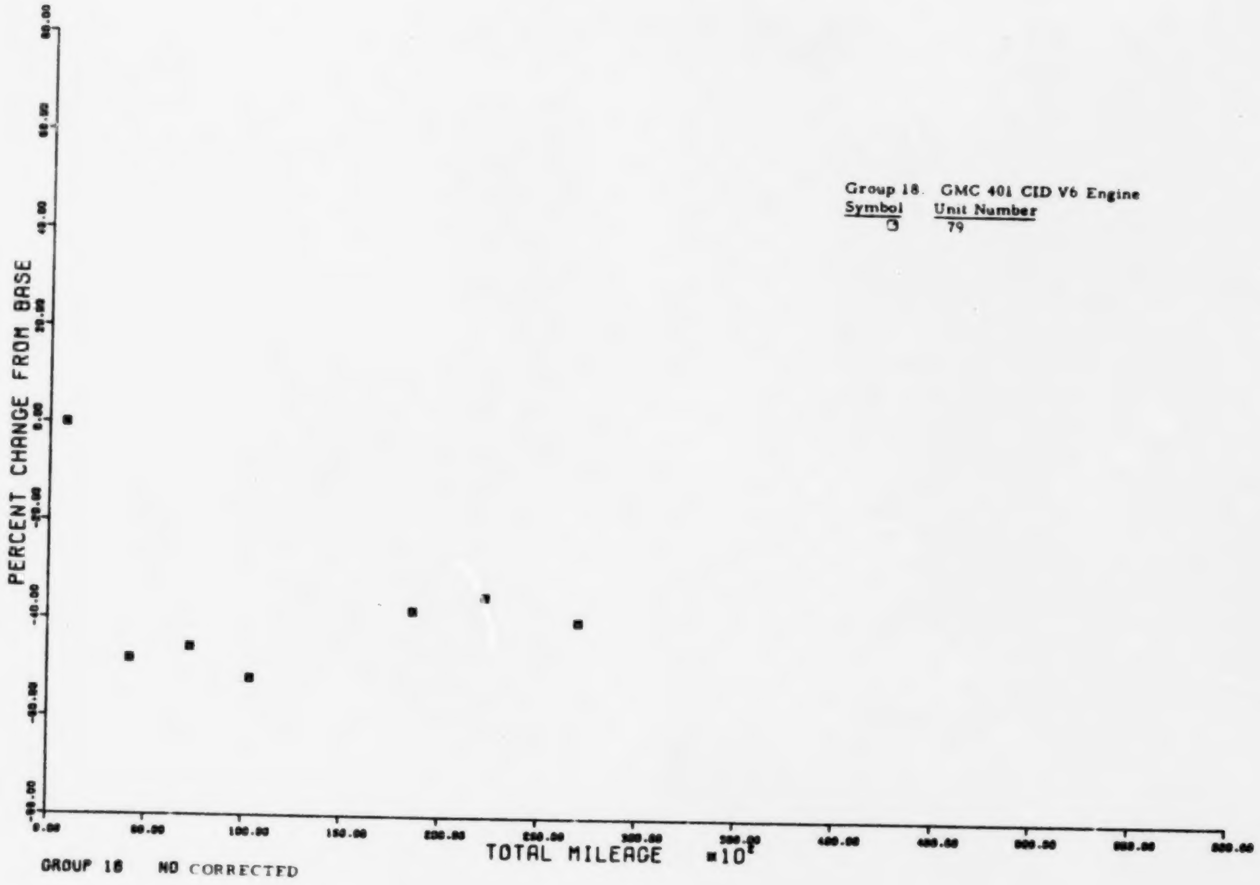


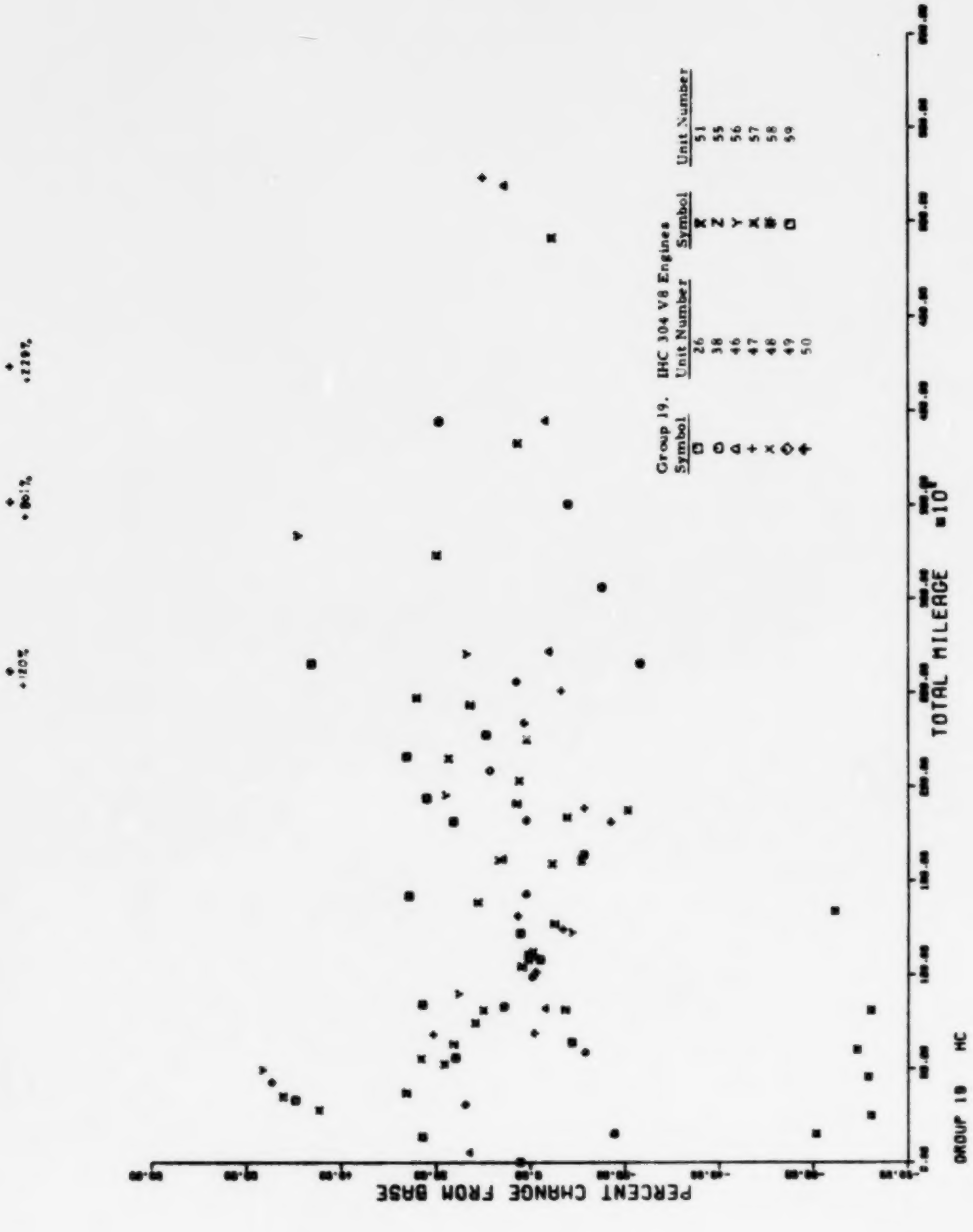
Group 18. GMC 401 CID V6 Engine

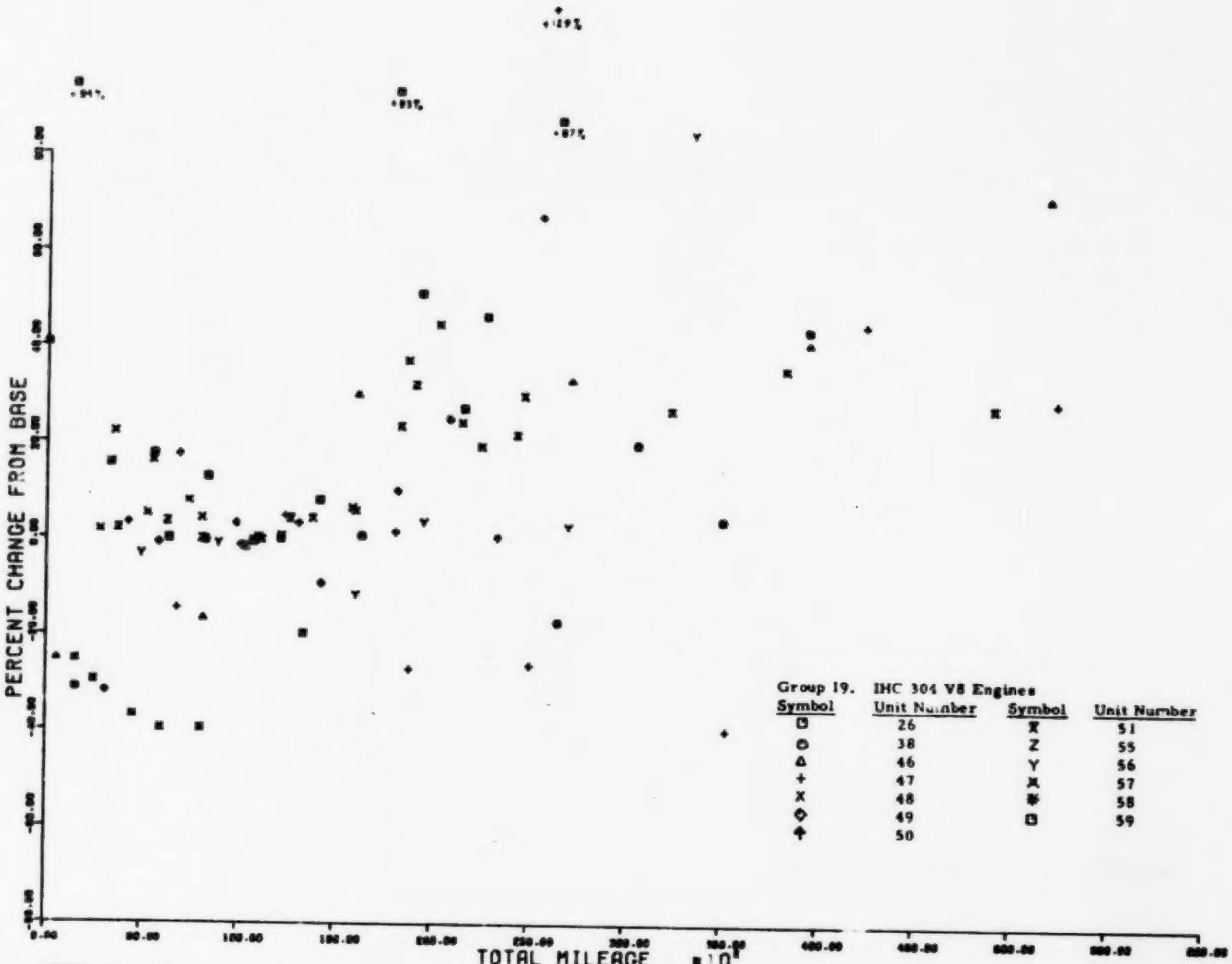
Symbol	Unit Number
⊡	79


+133%
+199%
+190%
+197%
+175%
+182%
Group 18. GMC 401 CID V6 Engine
Symbol
Unit Number
79
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10²
GROUP 18 CO

Group 18. GMC 401 CID V6 Engine
Symbol
Unit Number
79
PERCENT CHANGE FROM BASE
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10^{2}
GROUP 18 NO (NOT CORRECTED)

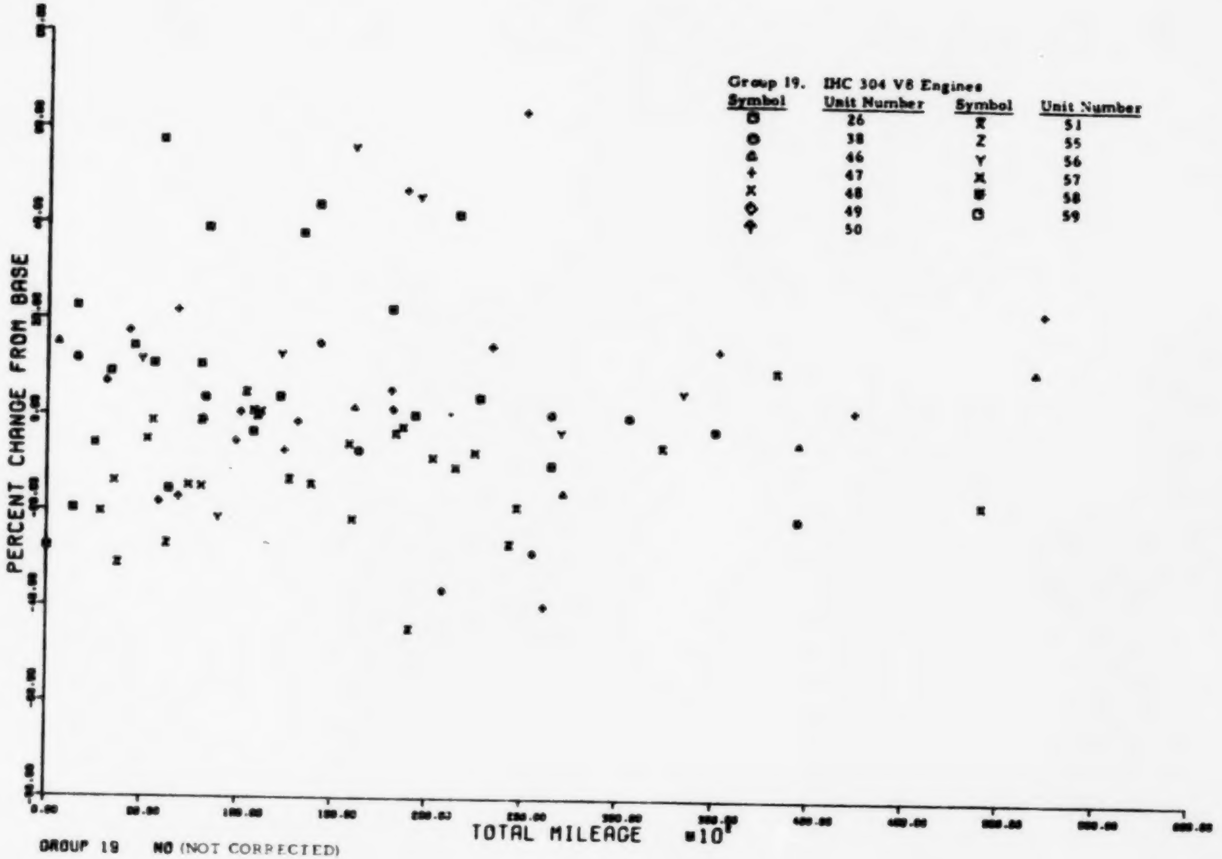

Group 18. GMC 401 CID V6 Engine
Symbol
Unit Number
79
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10²
GROUP 18 NO CORRECTED


+120%
+80%
+220%
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE
x10
GROUP 19 HC
Group 19. IHC 304 V8 Engines
Symbol
Unit Number
Symbol
Unit Number
□ 26
○ 38
△ 46
+ 47
X 48
◇ 49
✦ 50
Z 55
Y 56
X 57
58
□ 59
51

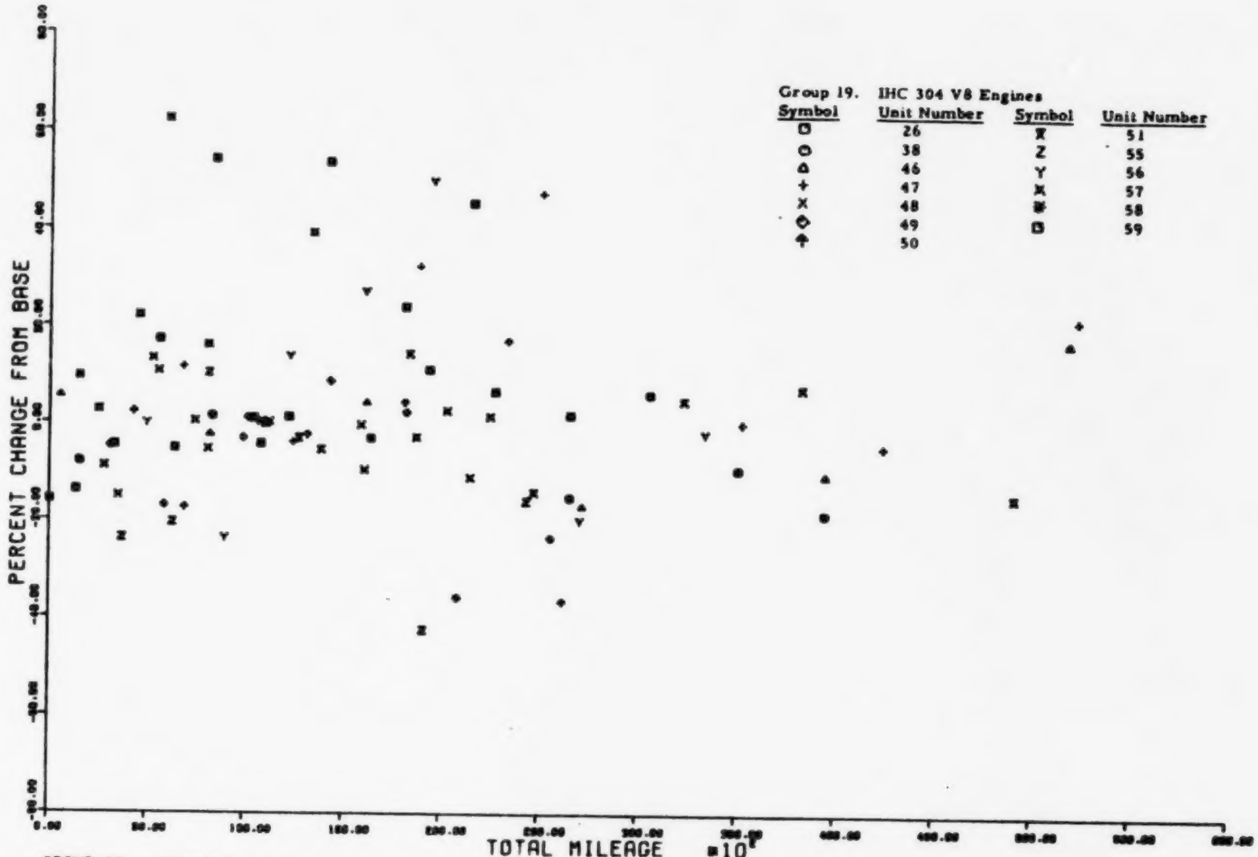


Symbol	Unit Number	Symbol	Unit Number
□	26	⌘	51
○	38	Z	55
△	46	Y	56
+	47	⌘	57
X	48	✱	58
◇	49	▣	59
✚	50		

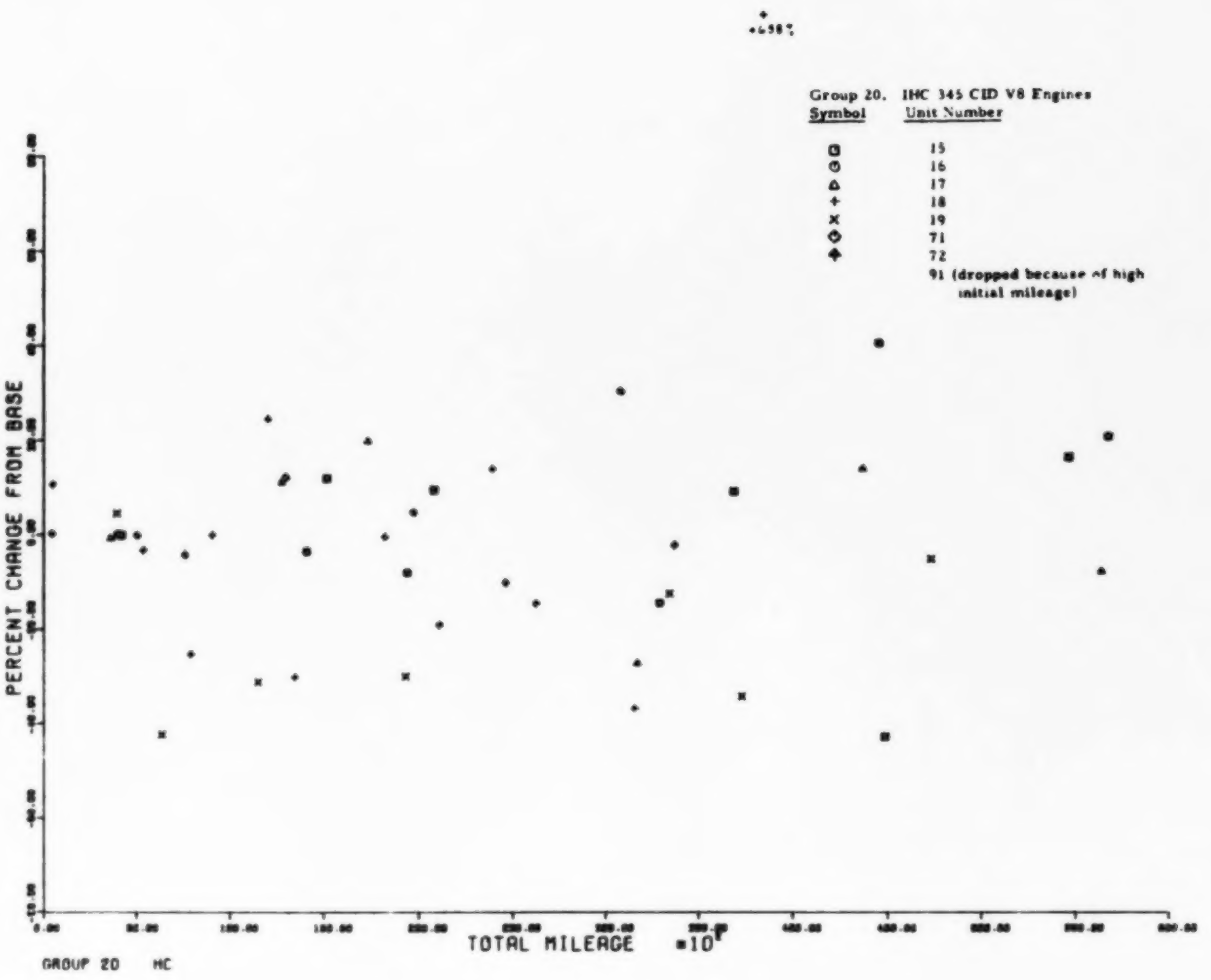
GROUP 19 CO

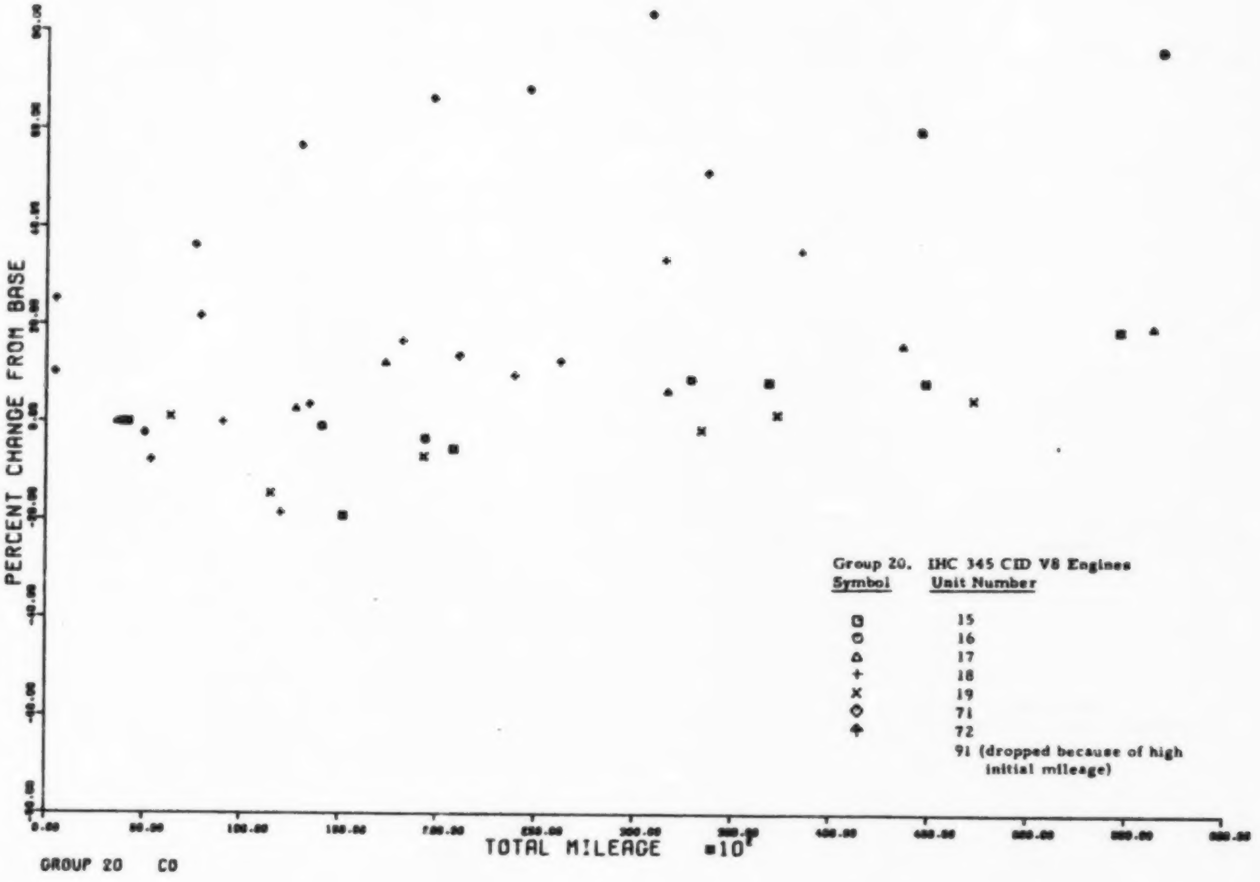


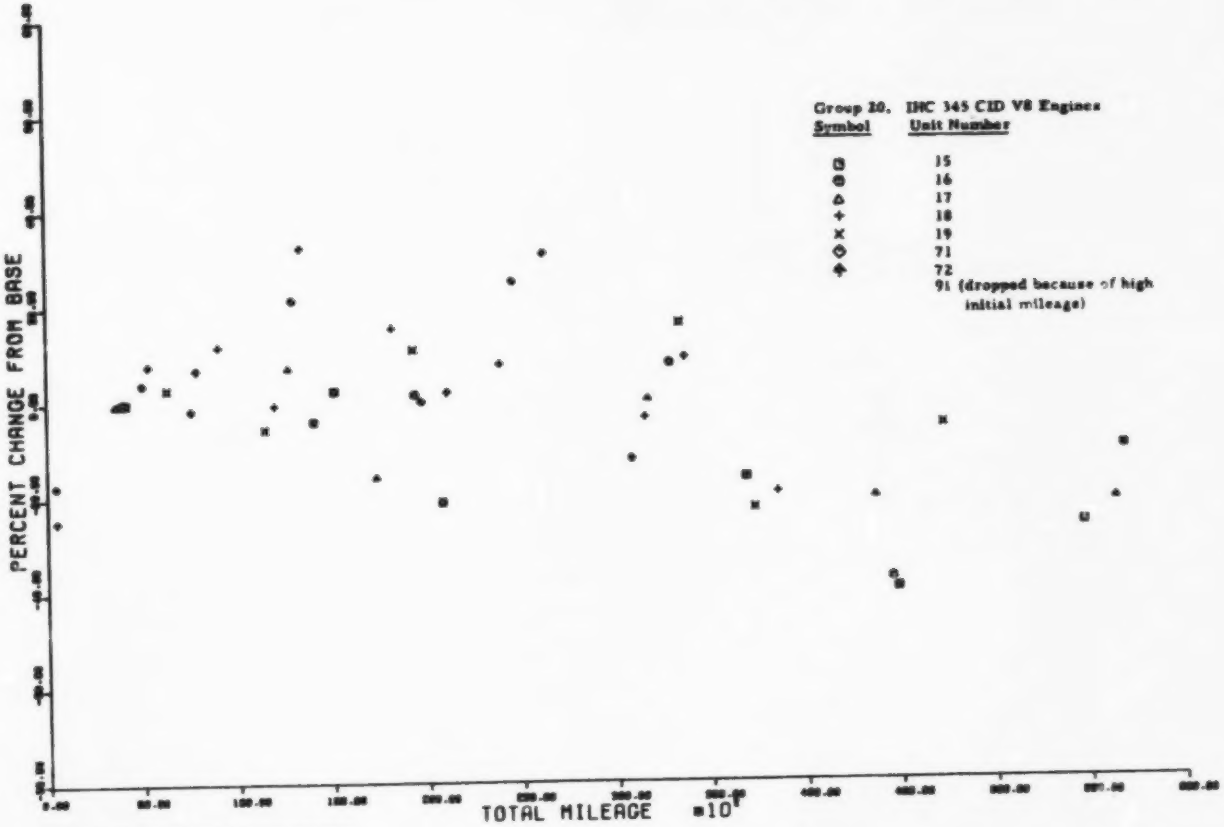
GROUP 19 NO (NOT CORRECTED)



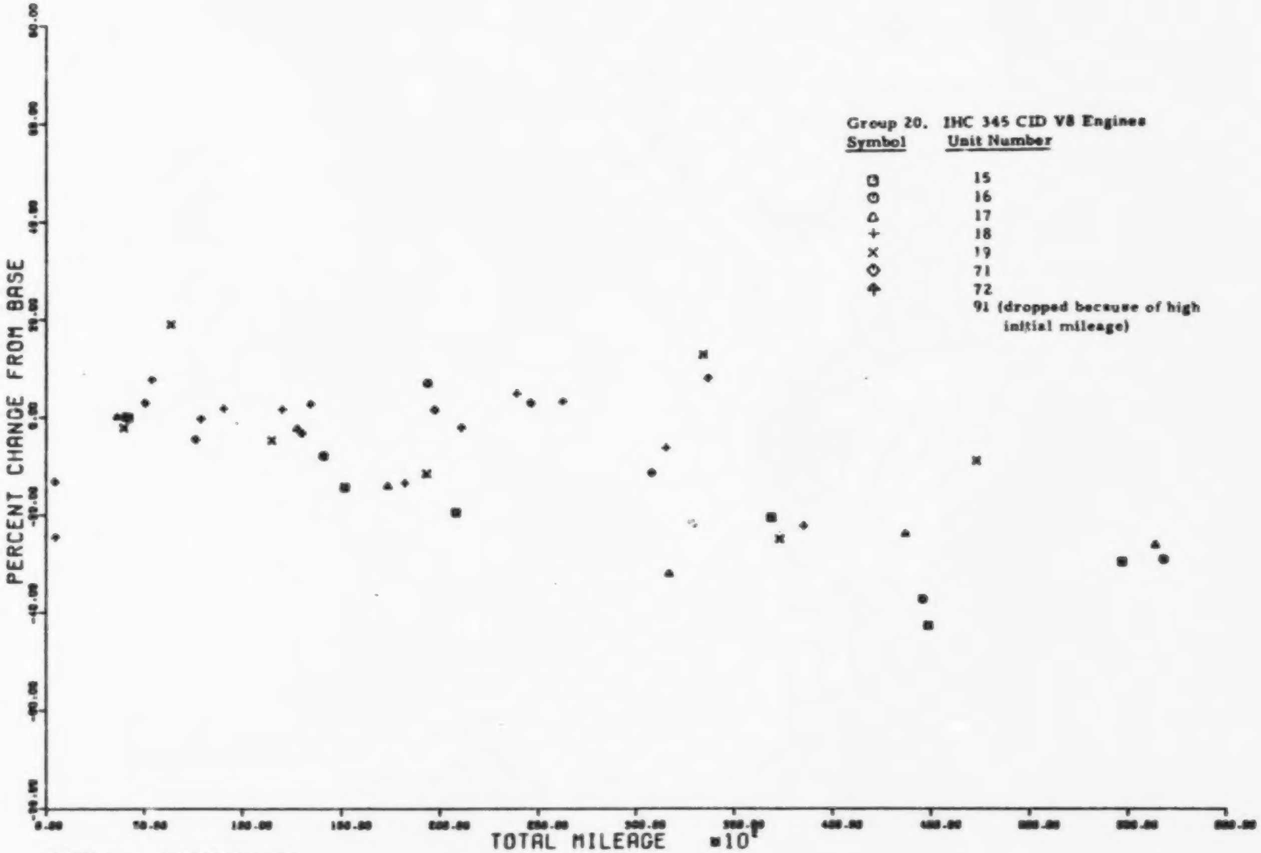
GROUP 19 NO CORRECTED


+658%
Group 20. IHC 345 CID V8 Engines
Symbol Unit Number
□ 15
⊖ 16
△ 17
+ 18
× 19
◇ 71
✦ 72
91 (dropped because of high initial mileage)
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE *10
GROUP 20 HC

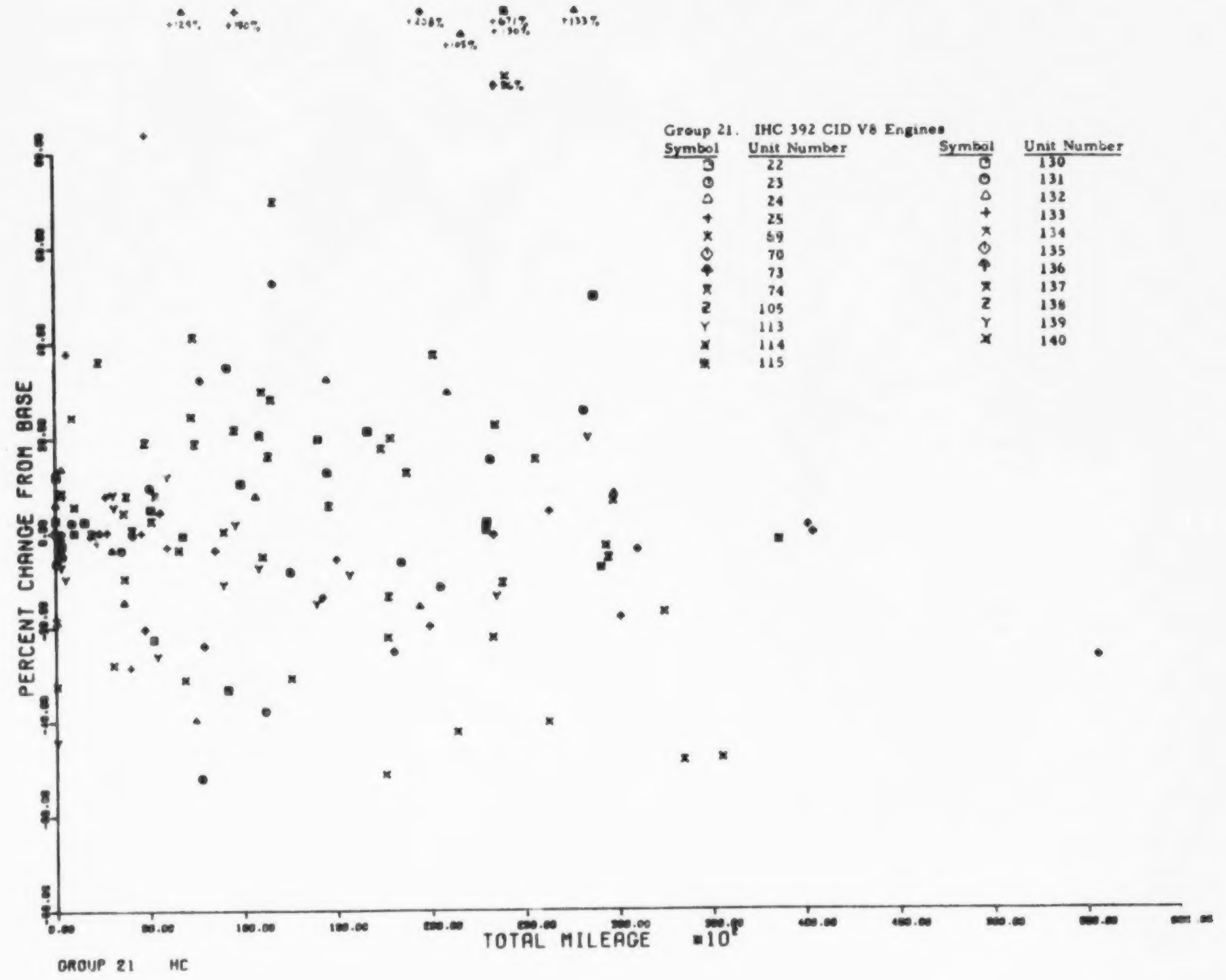

PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10
GROUP 20 CO
Group 20. IHC 345 CID V8 Engines
Symbol
Unit Number
□ 15
○ 16
△ 17
+ 18
× 19
◇ 71
✦ 72
91 (dropped because of high initial mileage)

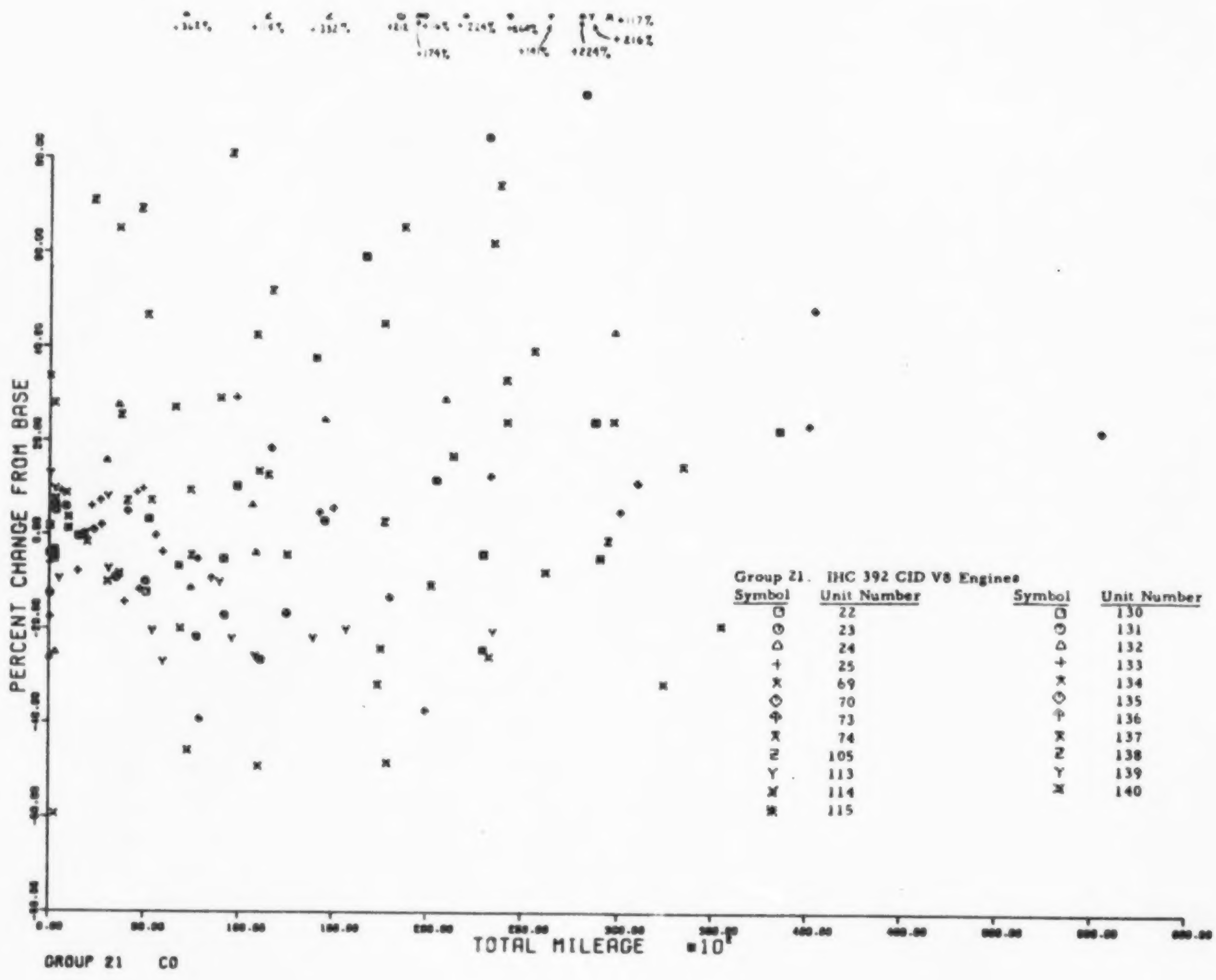


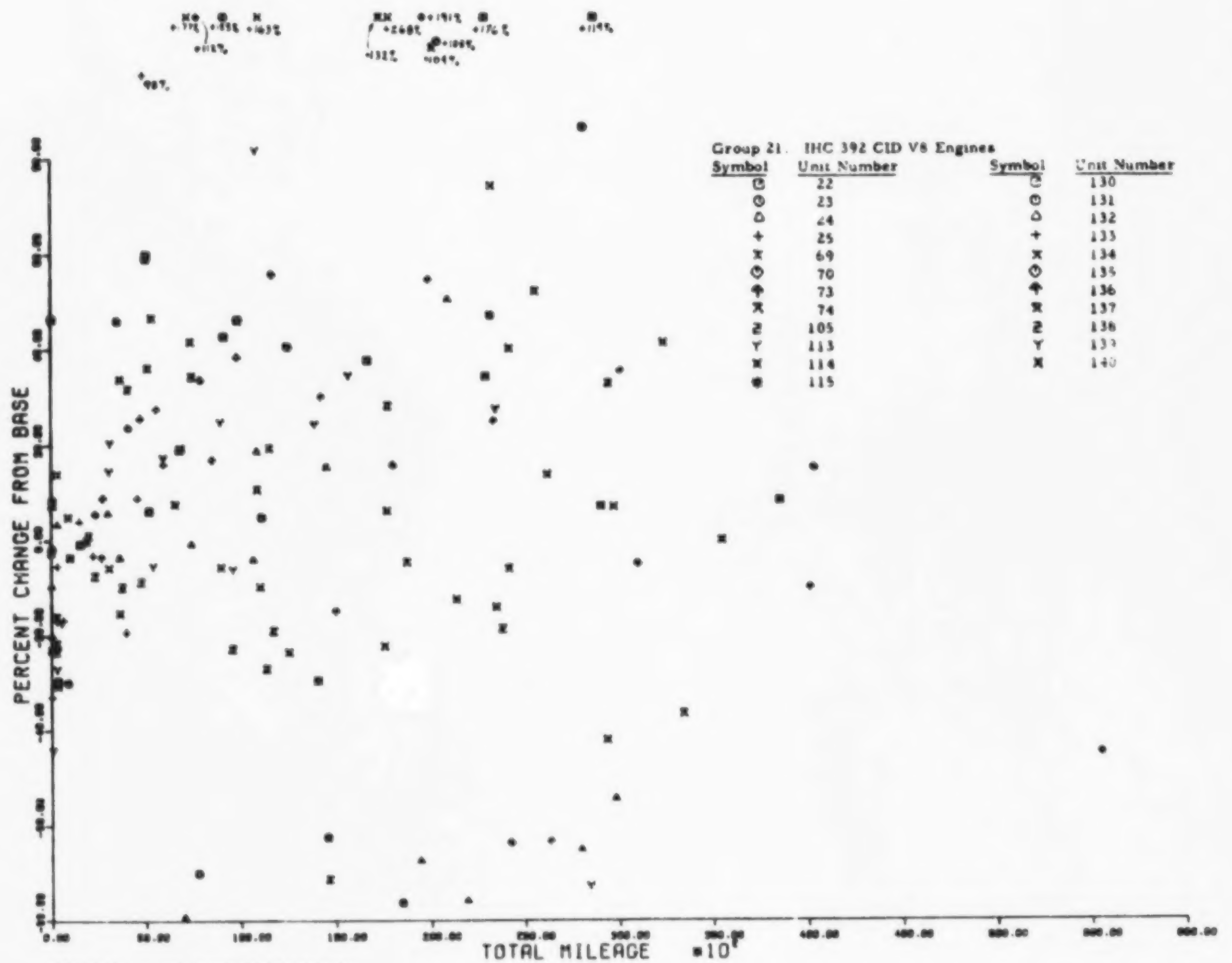
GROUP 20 NO (NOT CORRECTED)



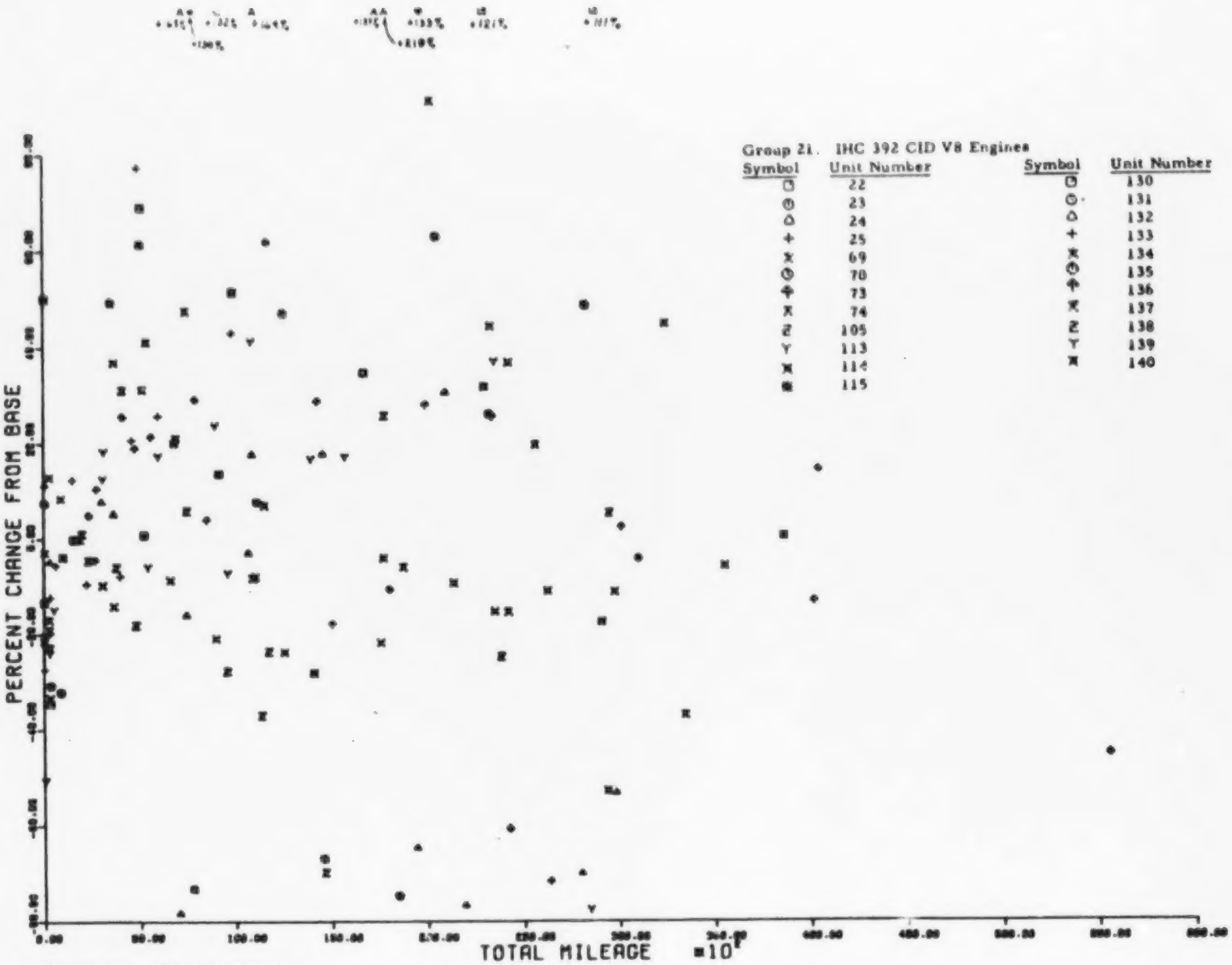
GROUP 20 NO CORRECTED


+124%
+190%
+238%
+105%
+671%
+130%
+133%
+96%
Group 21. IHC 392 CID V8 Engines
Symbol Unit Number
□ 22
○ 23
△ 24
+ 25
X 69
◇ 70
↑ 73
X 74
Z 105
Y 113
X 114
X 115
Symbol Unit Number
□ 130
○ 131
△ 132
+ 133
X 134
◇ 135
↑ 136
X 137
Z 138
Y 139
X 140
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10
GROUP 21 HC

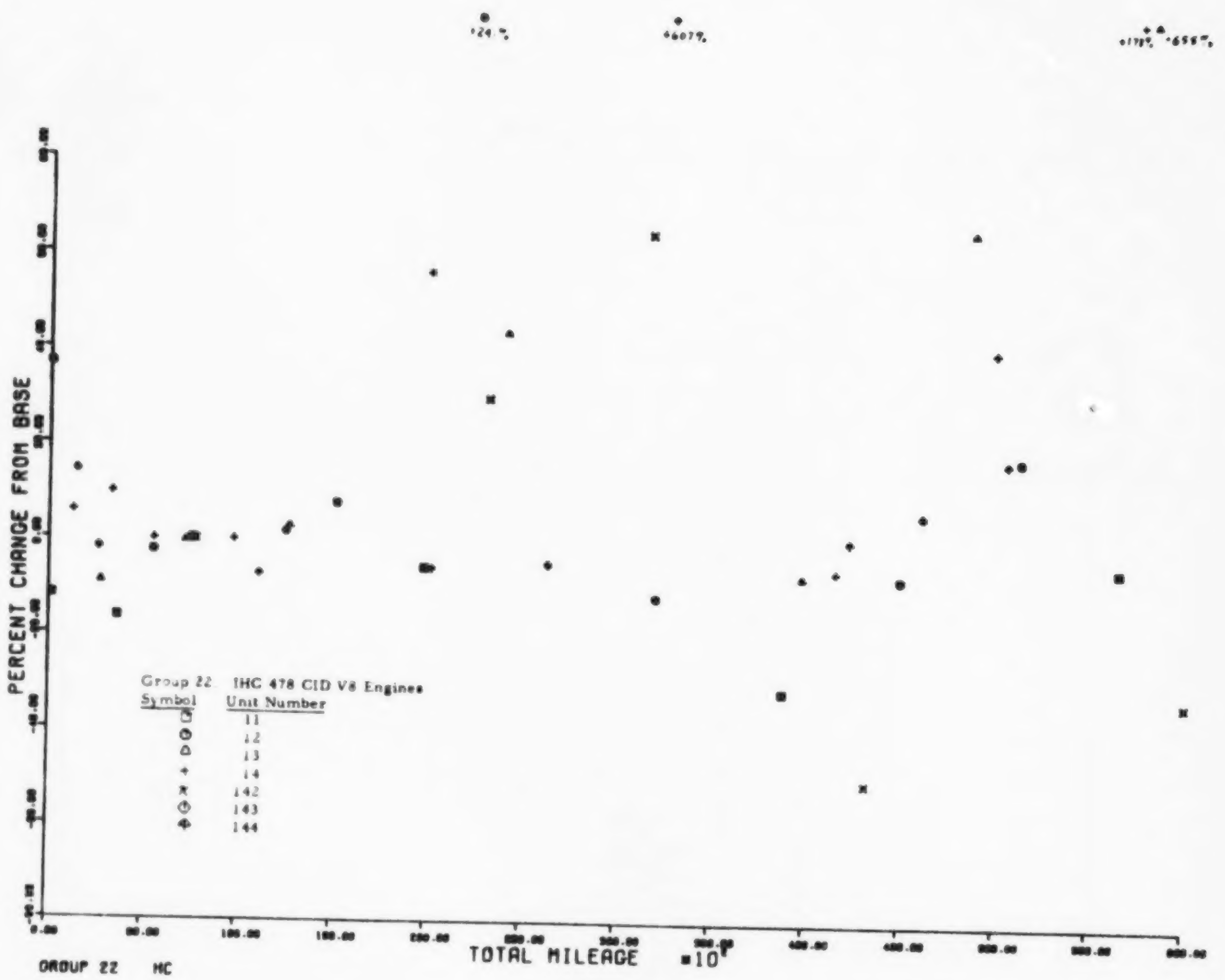

+368%
+332%
+174%
+224%
+224%
+117%
+816%
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10
GROUP 21 CO
Group 21. IHC 392 CID V8 Engines
Symbol
Unit Number
22
23
24
25
69
70
73
74
105
113
114
115
Symbol
Unit Number
130
131
132
133
134
135
136
137
138
139
140



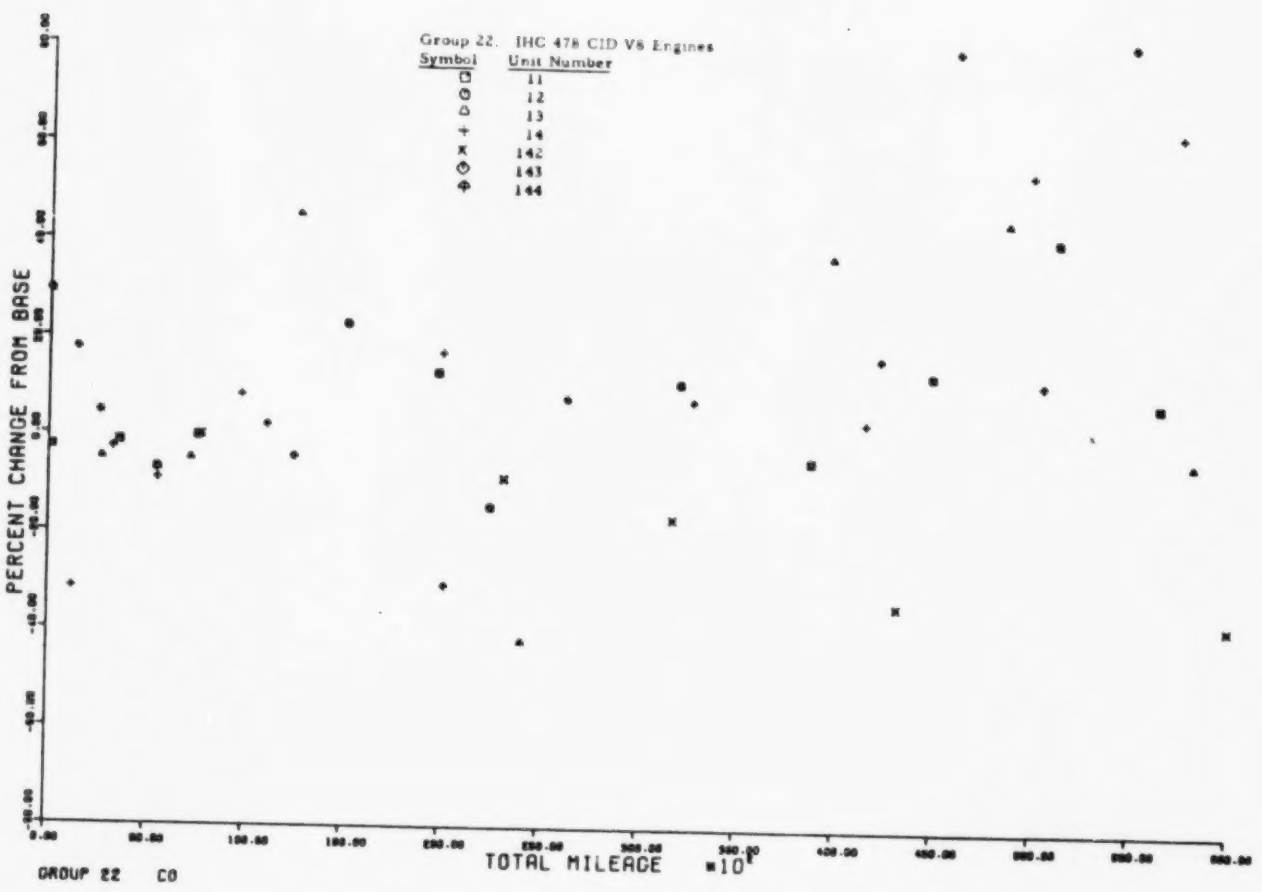
GROUP 21 NO (NOT CORRECTED)

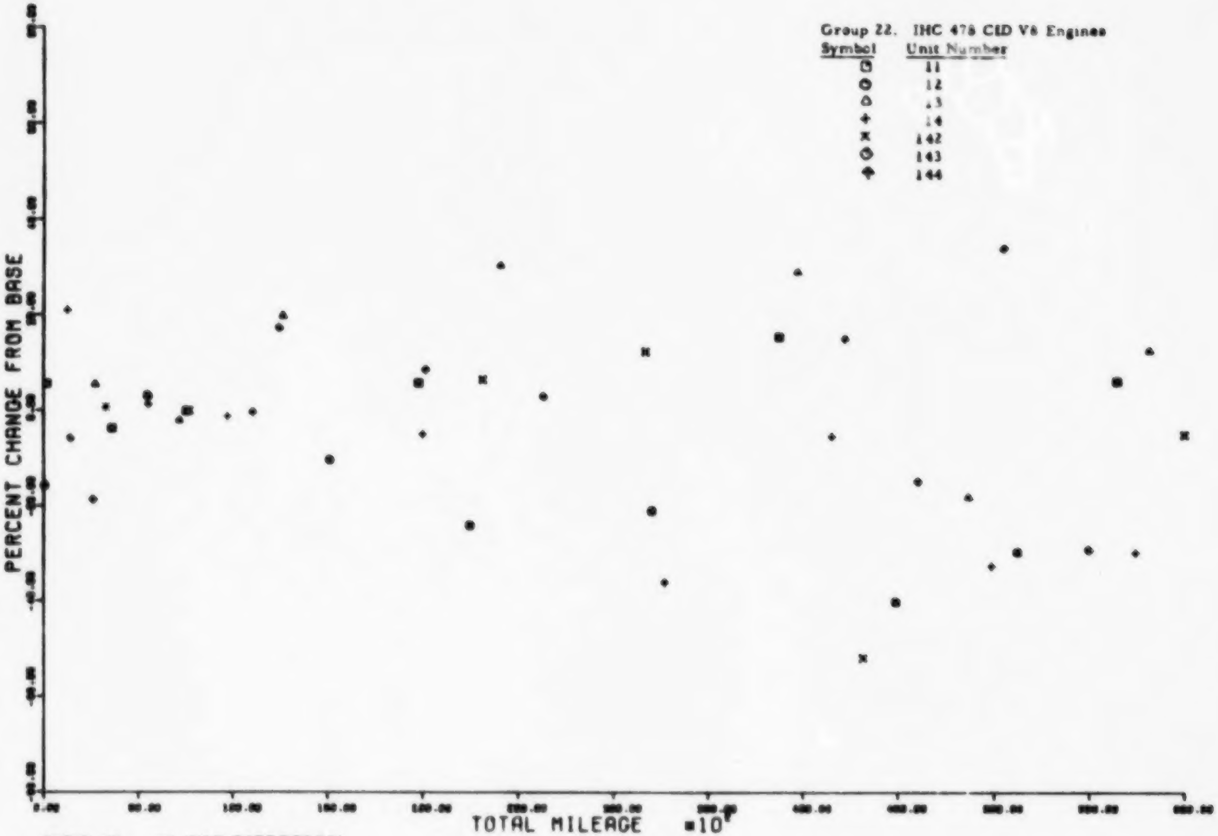


GROUP 21 NO CORRECTED

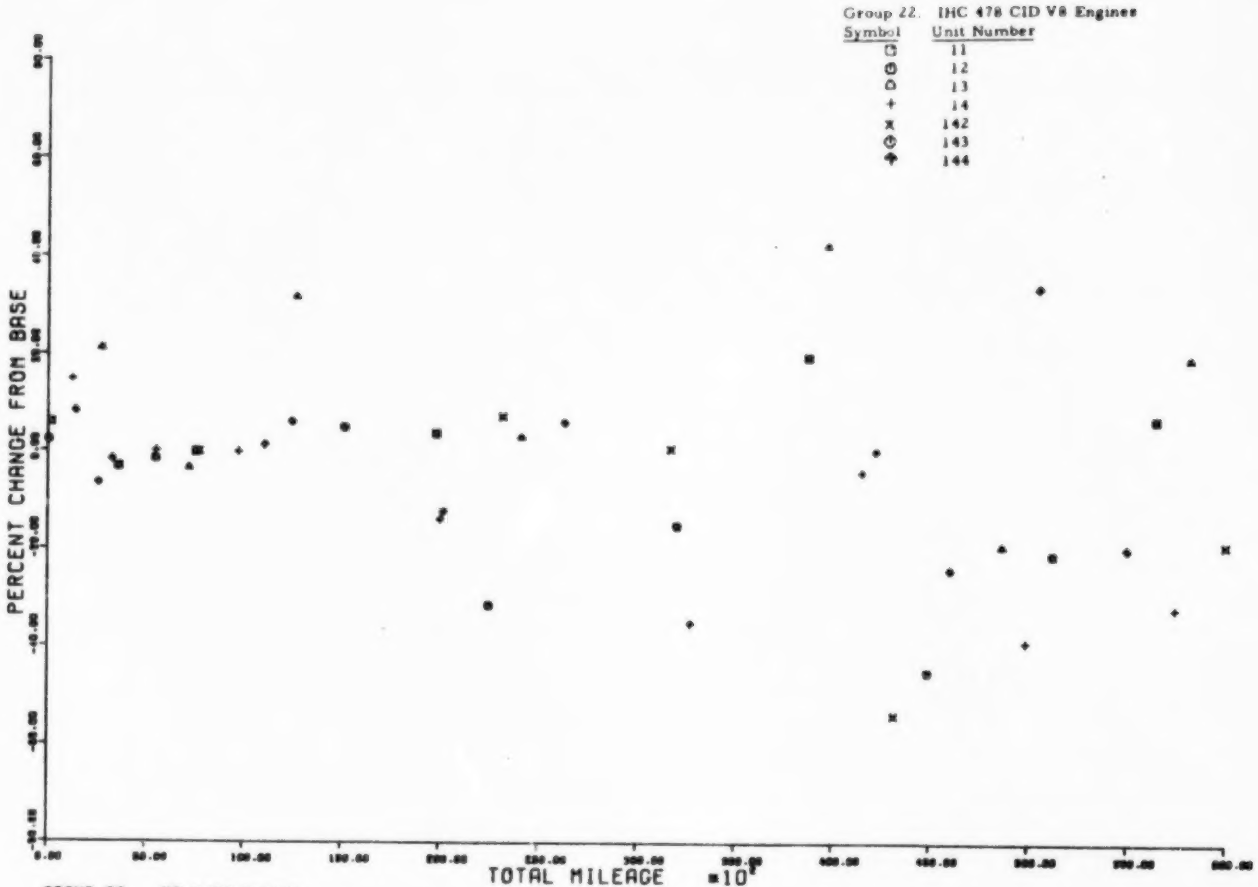


124.%
46079.
1719%
655%
PERCENT CHANGE FROM BASE
Group 22 IHC 478 CID V8 Engines
Symbol Unit Number
□ 11
⊖ 12
△ 13
+ 14
× 142
⦶ 143
⊕ 144
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE ×10¹
GROUP 22 HC

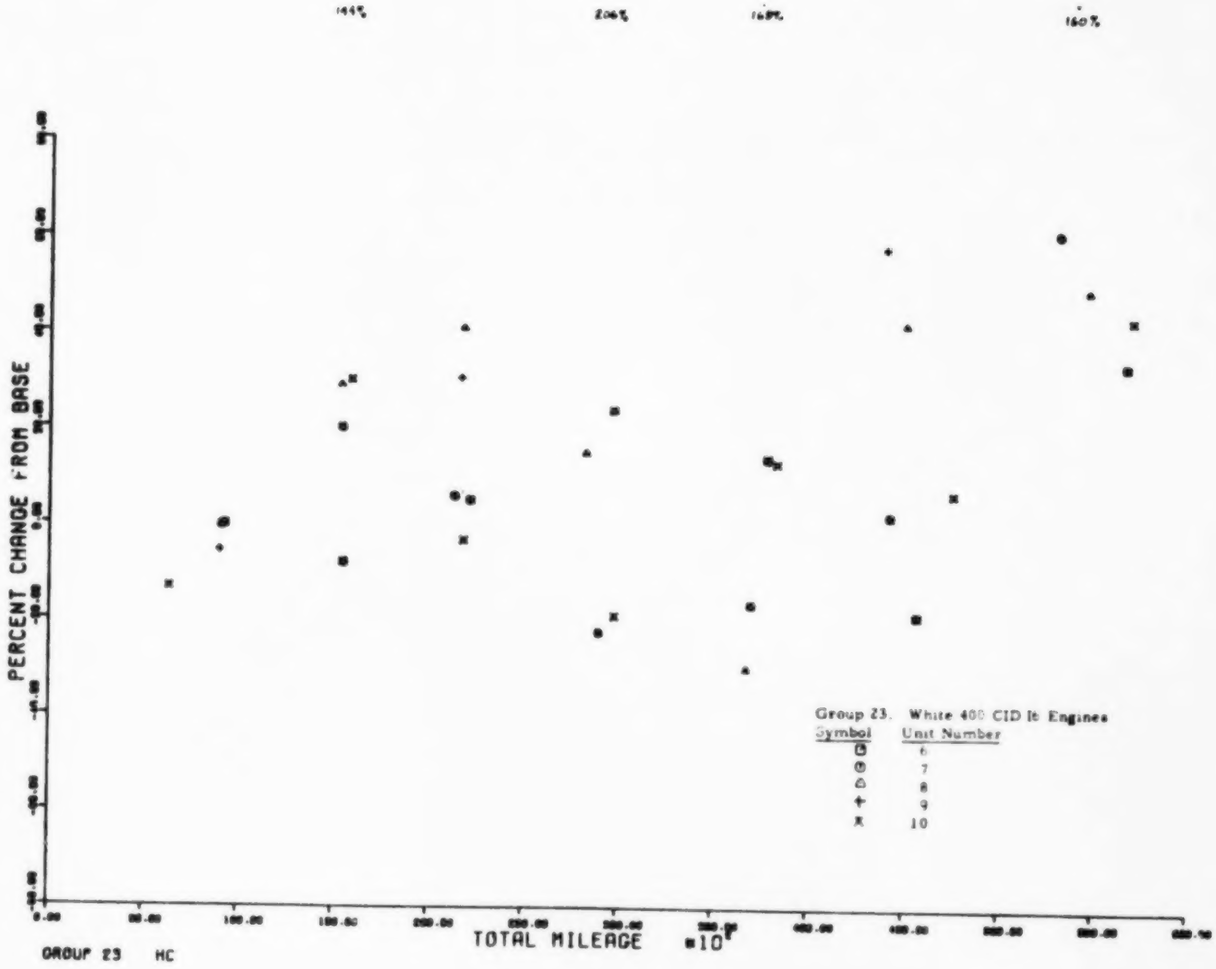

Group 22. IHC 478 CID V8 Engines
Symbol Unit Number
□ 11
⊙ 12
△ 13
+ 14
× 142
◇ 143
⊕ 144
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10²
GROUP 22 CO

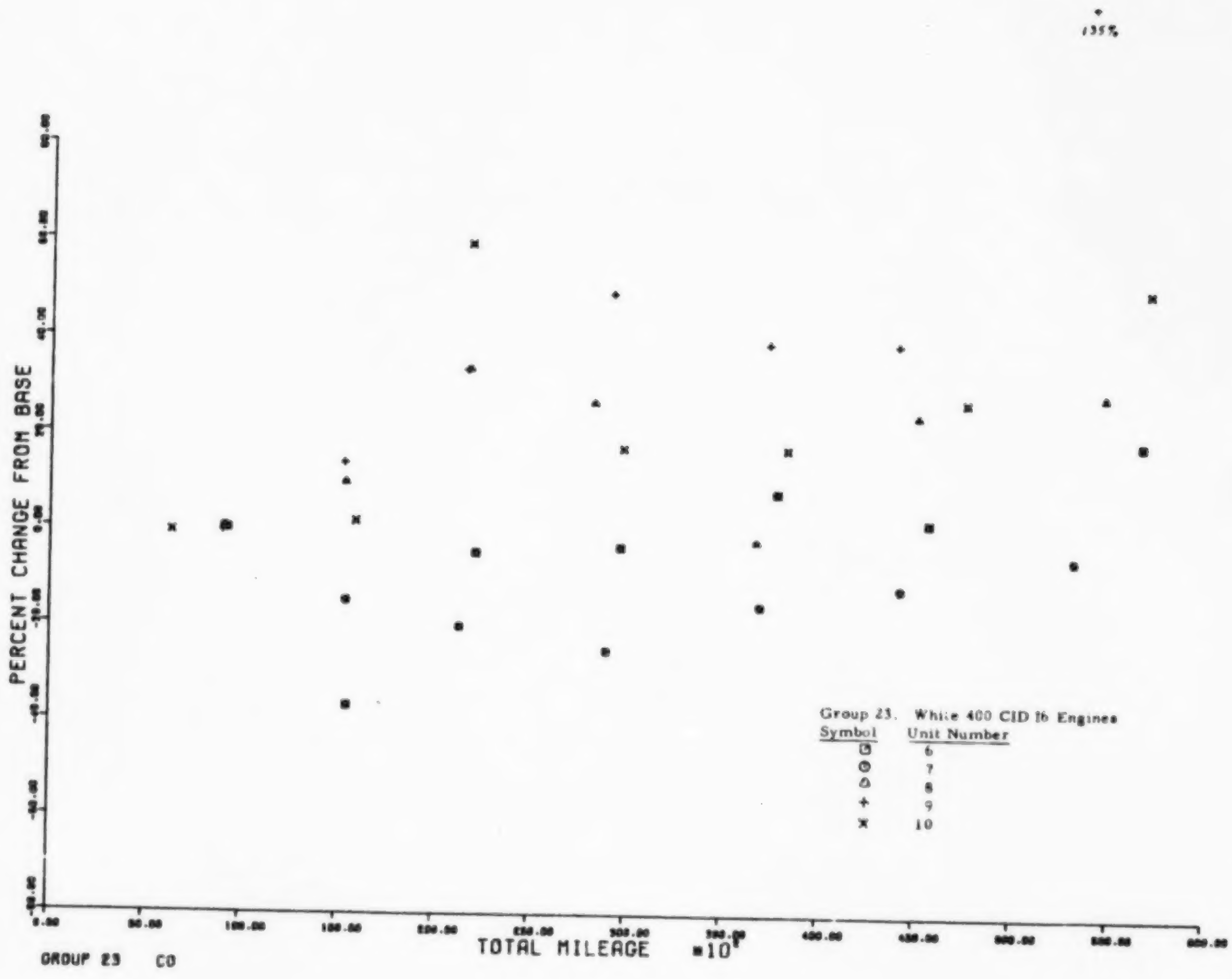


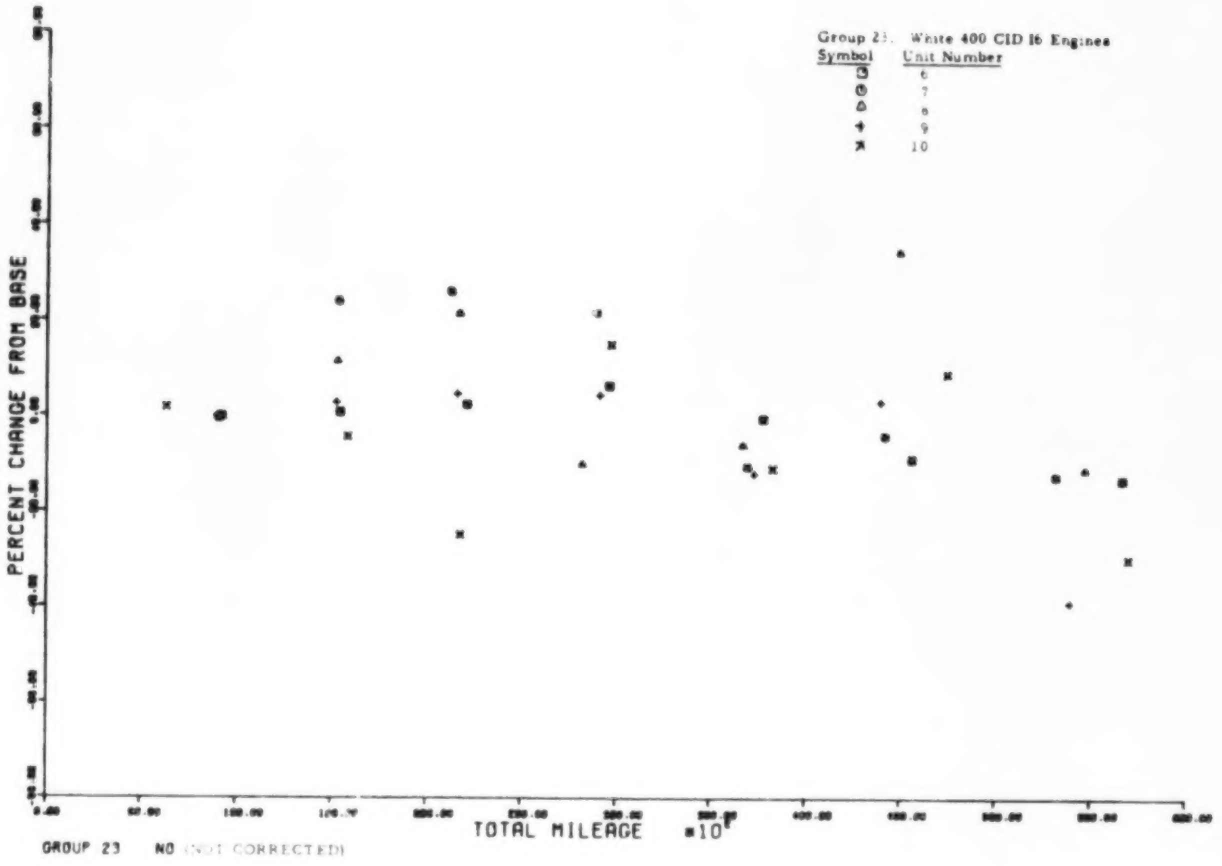
GROUP 22 NO (NOT CORRECTED)



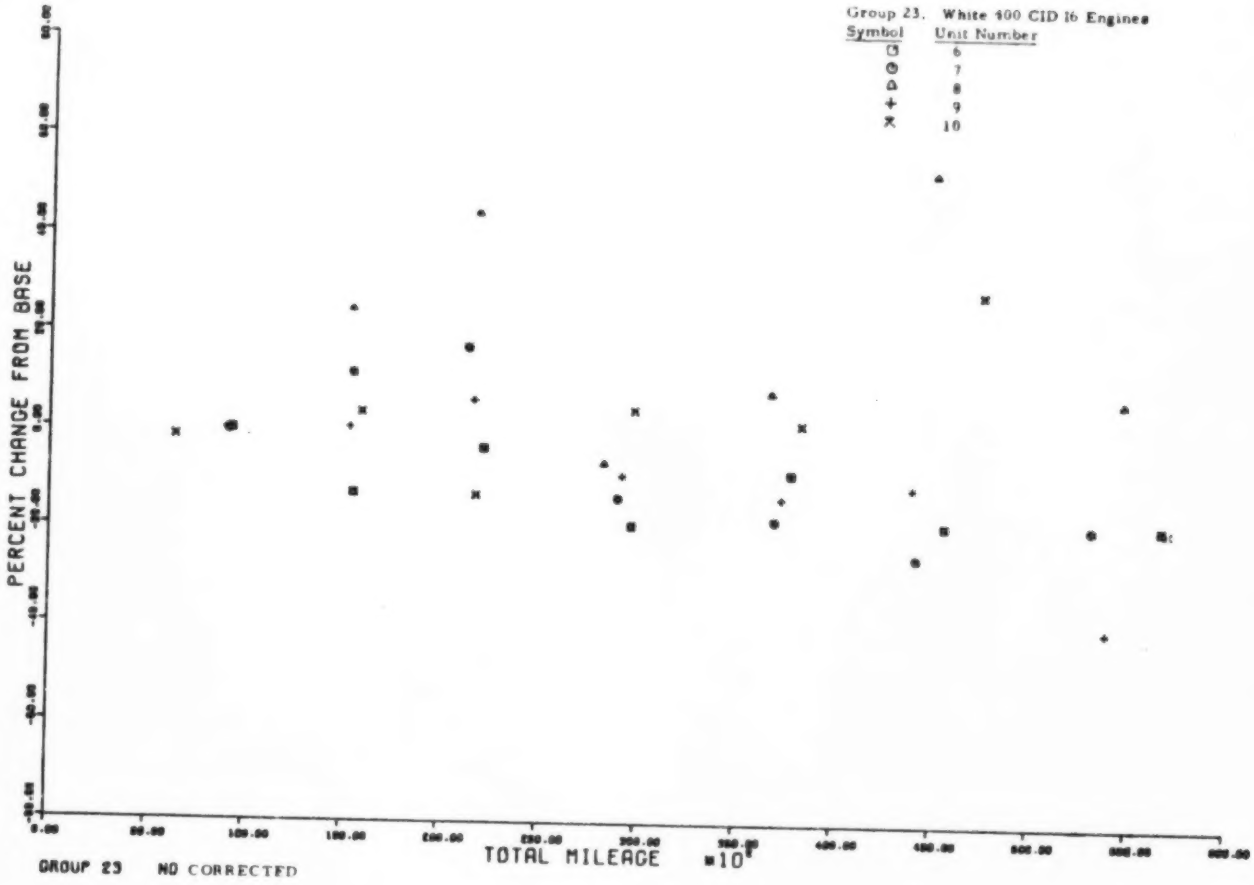
GROUP 22 NO CORRECTED


144%
206%
168%
160%
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE *10
GROUP 23 HC
Group 23. White 400 CID I6 Engines
Symbol Unit Number
⊡ 6
⊙ 7
△ 8
+ 9
✕ 10

135%
PERCENT CHANGE FROM BASE
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
500.00
550.00
600.00
TOTAL MILEAGE *10
GROUP 23 CO
Group 23. White 400 CID I6 Engines
Symbol
Unit Number
▣ 6
⊙ 7
△ 8
+ 9
× 10



Group 23. White 400 CID I6 Engines
Symbol Unit Number
□ 6
○ 7
△ 8
+ 9
✕ 10
PERCENT CHANGE FROM BASE
0.00
TOTAL MILEAGE ×10
0.00
100.00
GROUP 23 NO (NOT CORRECTED)



Group 23. White 400 CID I6 Engines